

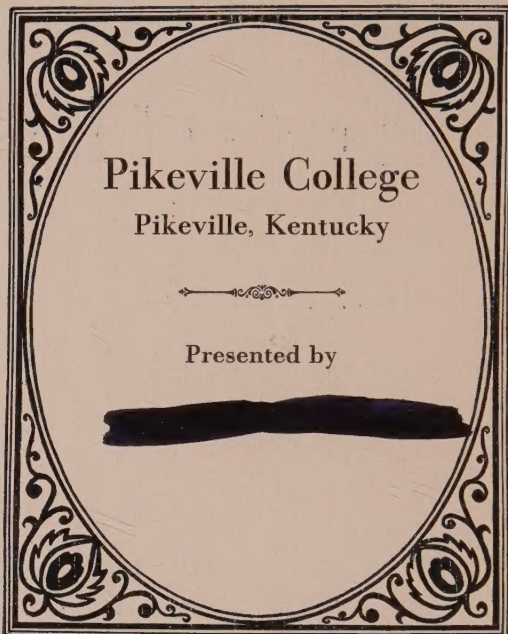
A decorative rectangular border with a repeating floral or vine-like pattern, enclosing the title and author information.

A TECHNIQUE FOR STUDYING
SOCIAL-MATERIAL ACTIVITIES
OF YOUNG CHILDREN

A small, symmetrical decorative flourish or scrollwork element centered below the title.

By Margaret Barker, Ph. D.

155.4 B255t 1930
Barker, Margaret.
Technique for studying the
social-material activities
of young children
\$25.hb . 15560



DISCARDED

NOV 12 2012

Frank M. Allara Library

A TECHNIQUE FOR STUDYING
THE SOCIAL-MATERIAL ACTIVITIES
OF YOUNG CHILDREN

By
MARGARET BARKER, Ph.D.

DISCARDED

NOV 12 2012

Frank M. Allara Library

BUREAU OF PUBLICATIONS
Teachers College, Columbia University
NEW YORK CITY
1930

15560

155.4
536
13
O'Rear-Robinson Library

ACKNOWLEDGMENTS

The author wishes to express deep gratitude to Professor Dorothy Swaine Thomas who initiated the observational study of the social behavior of children at the Child Development Institute and contributed greatly to the progress of this particular study.

To Professor Goodwin B. Watson, chairman of the dissertation committee, Professor Ralph B. Spence and Professor Helen M. Walker the author wishes to express appreciation for their sympathetic interest and guidance.

To Alma Perry Beaver, Ruth Hubbard, Ernest Osborne and Ruth Arrington the author is indebted for assistance in observation. To Ruth Arrington, in addition, acknowledgment is made of careful work on the classification of activities.

To Hallie Flack, Metta Rust, and other members of the Institute staff, acknowledgment is made of information given concerning the children studied. The author also wishes to express appreciation for the unfailing coöperation of the nursery school teachers during observations.

To Laura Krieger, the author is particularly indebted not only for encouragement and advice, but also for a large amount of actual assistance.

M. B.

CONTENTS

CHAPTER	PAGE
I. INTRODUCTION AND DESCRIPTION OF TECHNIQUE.....	1
Method	2
II. RELIABILITY OF TECHNIQUE	13
Distance Covered, Social Contacts, and Time of Activities	13
III. RELIABILITY OF TECHNIQUE (<i>Continued</i>)	26
Number of Activities	26
Final Classification	28
IV. SOME FACTORS INFLUENCING OBSERVATIONS.....	39
Temperature.....	39
Humidity	41
Change over a Period of Time	42
Location	43
V. INDIVIDUAL DIFFERENCES	44
VI. SUMMARY AND CONCLUSIONS	66

CHAPTER I

INTRODUCTION AND DESCRIPTION OF TECHNIQUE

The study of any aspect of behavior seems to divide itself into four problems: reliability of the measure of activity; constancy of behavior; ability of the measure under consideration to differentiate between individuals; and significance of the measure as expressed in terms of its relationship to other behavior.

The problem here is to evaluate a technique for studying the behavior of children, in this case, their spontaneous reactions to material objects and to people. The children observed, two to three years of age, attended the nursery school of the Child Development Institute, formerly known as the Institute of Child Welfare Research of Teachers College, Columbia University. A brief history of the organization is given in *The Twenty-eighth Yearbook of the National Society for the Study of Education*.

The Institute for Child Welfare Research, established in 1924, is an independent unit in Teachers College, Columbia University, coöordinated with the School of Education and the School of Practical Arts. It was established for the purpose of conducting research and promoting investigation in the pre-school period of education. The departments of nutrition and kindergarten first-grade have representatives on the staff of the Institute. The relation to other departments is of a consultant and coöperative nature. The Child Study Association of America has been closely associated with the Institute and the director is a consultant on the Institute staff. The Institute has a wide consultant relationship with the various educational and social service associations in the city.

The program of research has been along three general lines (1) social, psychological reactions of children (2) nutrition experiments (3) physiological research carried on by the Medical Department.¹

Forty children attend this nursery school every year; twenty from two to three years of age and twenty from three to four. The group is highly selected, in fact, most of the children belong to the upper twenty-five per cent of the population according to mental test measurement on the Kuhlmann revision of the Binet-Simon Test.

Smallness of the group and marked selectivity are not limitations when the problem is development of the technique and the testing

¹ Page 290.

2 *Studying the Social-Material Activities of Young Children*

of its reliability provided there is a sufficiently wide range of behavior in the group studied. These two factors are decided limitations, however, when an attempt is made to find out whether the observations reveal individual differences. The reliability of the technique for measuring the social-material activities of children is the major problem here. The ability of the measures to reveal individual differences will be considered merely to suggest possible relationships for future study.

METHOD

The nursery school children play on the roof for about an hour and a half in the morning and their responses are more uncontrolled than during any other part of the school day. This time was chosen, therefore, for trying out the technique. A floor plan of the roof was made to scale and two observers, taking records independently, simultaneously charted the movements of some child during intervals of five minutes. These charts of the floor plan were 16 x 11 inches and were attached to beaver board by means of thumb tacks. At the end of an observation, the sheet was pulled off without removing the tacks and placed in a large manilla envelope pasted to the back of the board. After making these double records to study reliability, single continuous records of ten children were made, one observer taking one five-minute period and a second observer the next, because time was sometimes needed in which to finish recording what had been observed.

By the use of colored pencils, a simple activity code was evolved for indicating progress from thing to thing and person to person. Activities were timed with a stop watch. This code follows and then the records taken on one child for a morning are given to illustrate the directions of the activity code.

ACTIVITY CODE

Lead pencil line always for a given child's activity

Red crayon line for other person's activity

Lines indicate progress of child

Solid, when spontaneous 

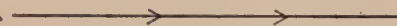
Broken, when directed 

Cross indicates end of activity

Solid, when spontaneous 

Broken, when directed 

Capitals indicate beginning and end of activity

A   B  CD

explained by marginal notes

AB = pulling wagon.

CD = jumping

Temporary distractions indicated by exponents

A   A'B'   A²B²   B.

AB = pushing doll carriage

A'B' = hits Paul

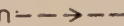
A²B² = smiles at teacher

Circles and Triangles indicate other persons,
children by given numbers, teachers by T

Triangles, if person is involved in child's activity
when record begins  

Circles, if person approaches child

spontaneously  

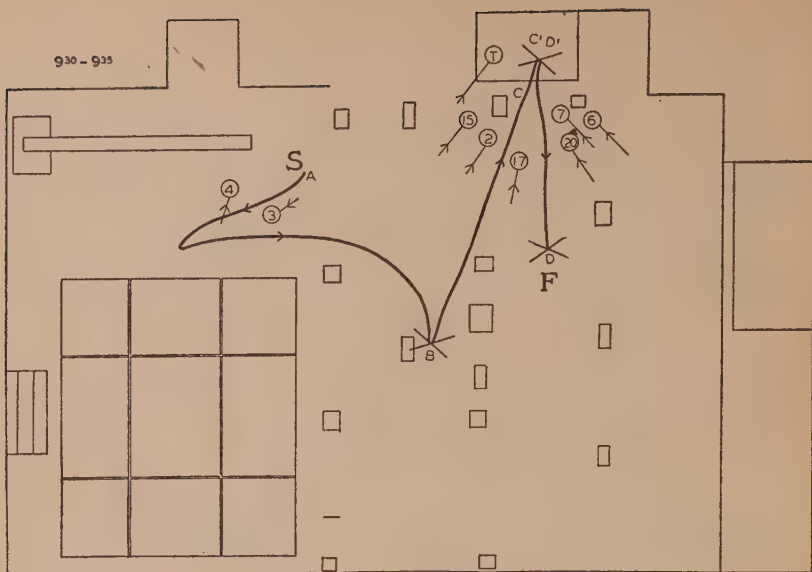
at child's direction  

if child approaches another person 

if person approached leaves child  

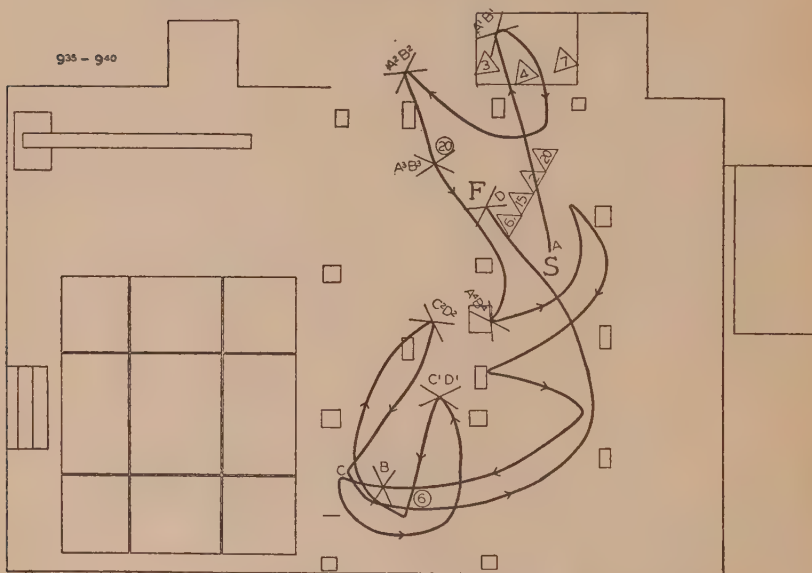
S indicates start of five minute record

F indicates finish of five minute record



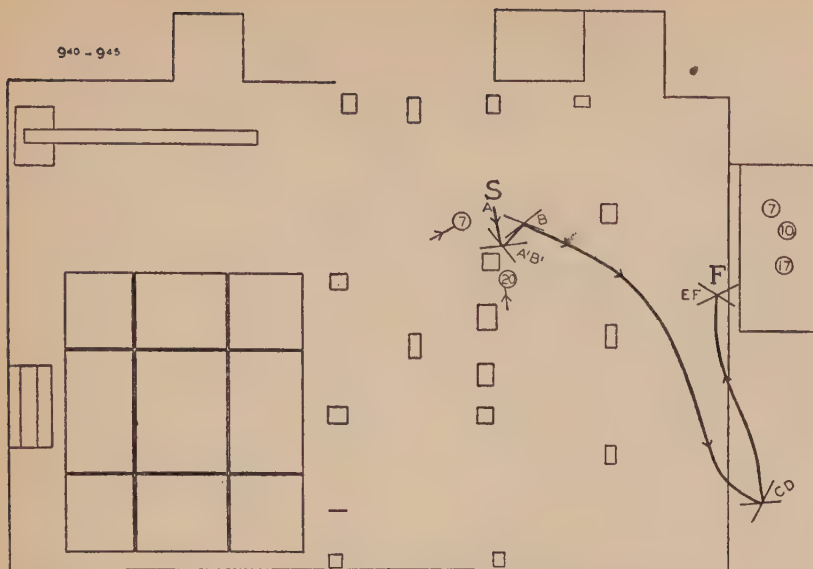
EDWARD—12/6/28—M. B.

AB—Rolling kegs, then straddling one	145"
CD—Taking blocks out of closet and arranging train	145"
C'D'—Teacher wipes his nose	5"



EDWARD—12/6/28—DST

AB—Piling blocks. Making train with them	84"	A'B'—Puts blocks in swing and swings them	50"
A'B'—Embraces Peter	50"	CD—Rolling barrel—piles blocks up	97"
A'B'—Looks at lid	4"	C'D'—Pushes blocks out of swing	—
A'B'—Embraces Joan	2"	C'D'—Pushes blocks out of swing	—



EDWARD—12/6/28—M. B.

AB—Playing with blocks, standing on block, looking at Joan who has come up and stood on other blocks

A'B'—Joan comes up and sits on his

77"

blocks. Edward says "No, mine," and pushes her away

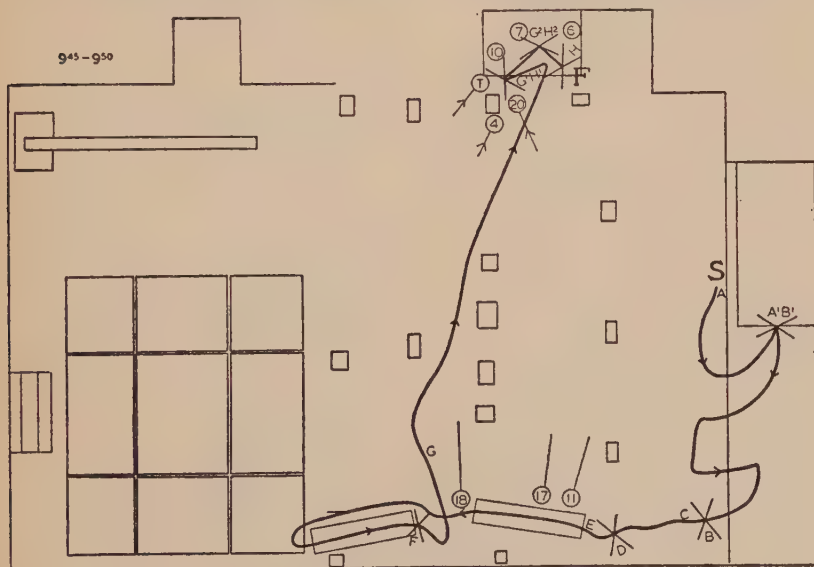
CD—Playing with chair

EF—Activity in sandpile. Digging in sand with stick and then trowel

5"

55"

149"



EDWARD—12/6/28—DST

AB—In sandbox

A'B'—Looks at observer

CD—Rolls keg

EF—Slide

GH—Picks up small block; blows as if

34"

10"

6"

53"

horn; takes it into closet; opens and shuts doors

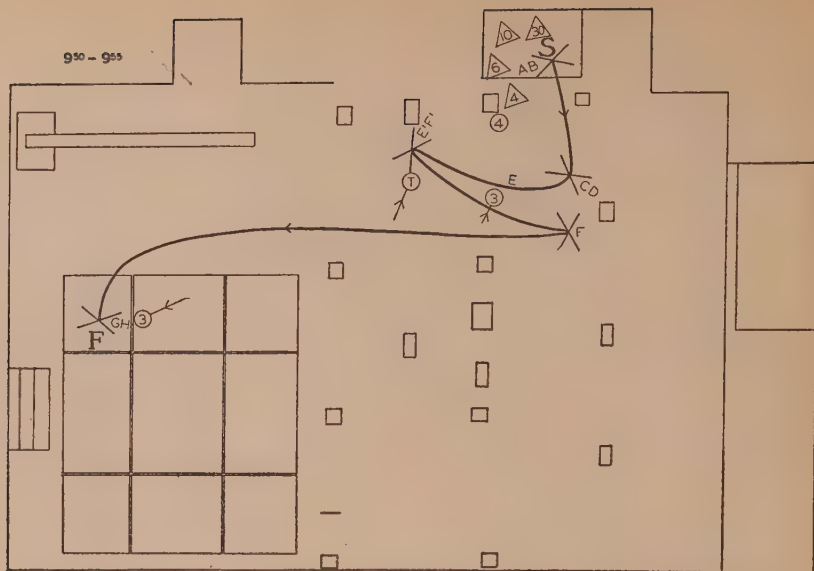
184"

G'H'—Teacher fixes mitten and wipes nose

12"

G'H'—Pushes Harold

2"



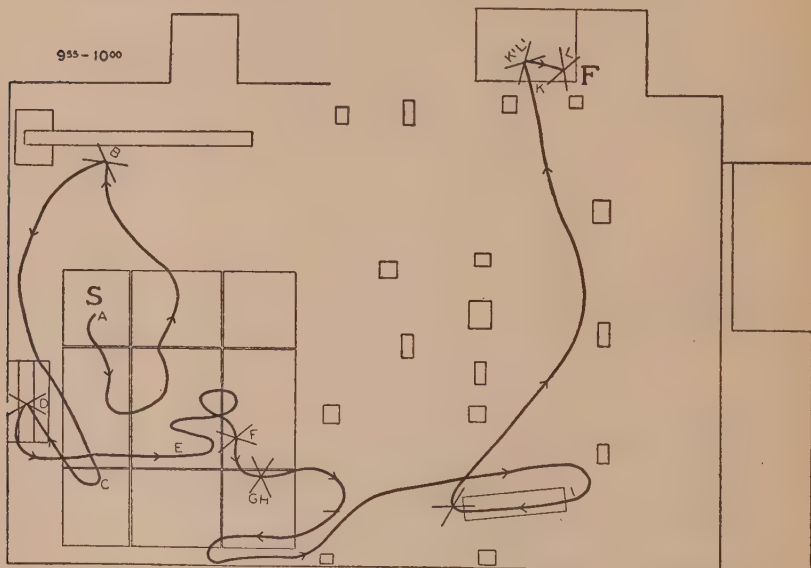
EDWARD—12/6/28—M. B.

AB—In closet. Opening and closing doors
 CD—Blocks
 EF—Rolling keg. Rolls it against Peter who falls down. Rolls it on top of him; then teacher intervenes. Turns to Paul and

76"
 8"

tries to get him to sit on barrel; knocks Paul's cap off; Paul cries; teacher intervenes
 E'F'—Tells teacher what he was trying to do
 GH—Playing on mat with Paul

170"
 22"
 12"



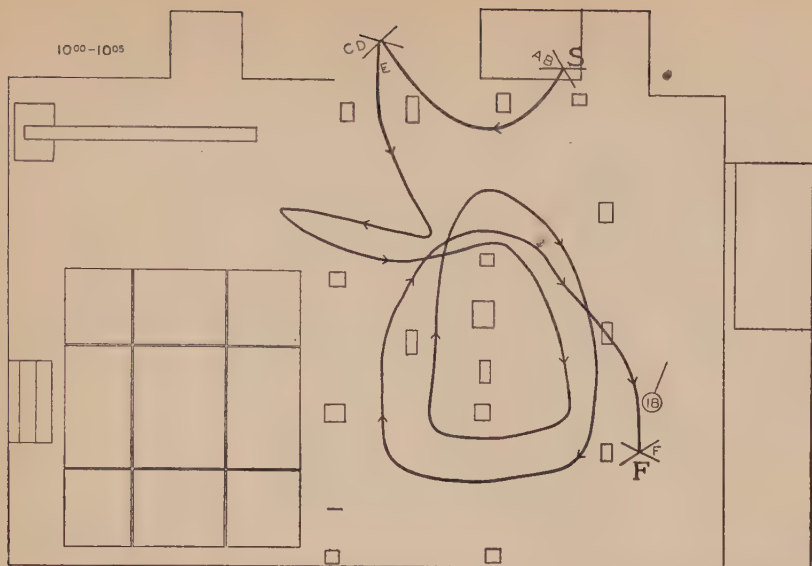
EDWARD—12/6/28—DST

AB—Plays with and mauls Paul. Teacher intervenes
 CD—Goes up to Alma. Throws cover at her
 EF—Jungle gym

60"
 11"
 100"

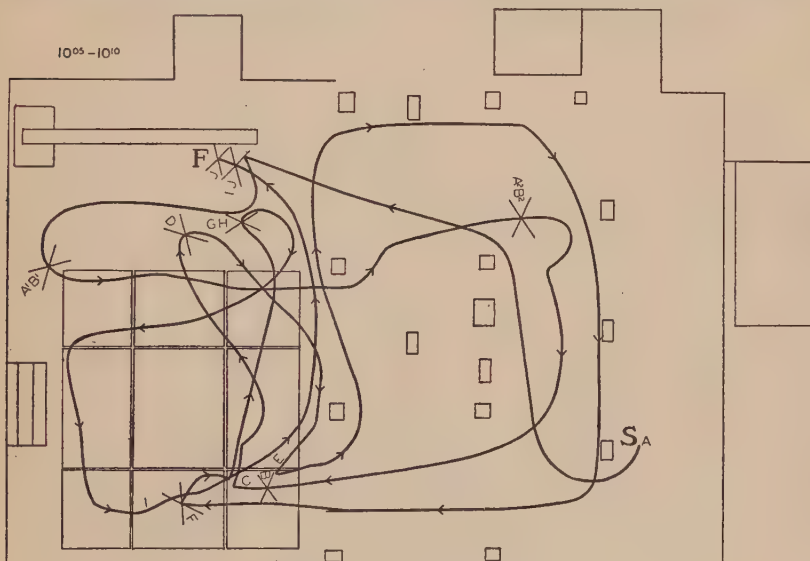
GH—Somersaults
 IJ—Slide
 KL—In closet
 K'Ll—Knocks Paul down; teacher intervenes

3"
 30"
 50"
 2"



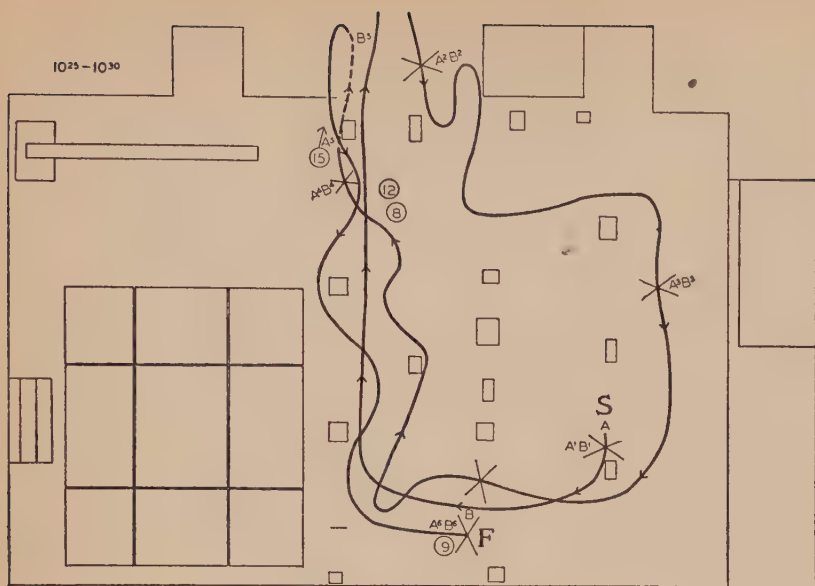
EDWARD—12/6/28—M. B.

AB—In closet		12"
CD—Out in hall watching fourth floor children and part of time watching men at elevator	186"	
EF—Lionel leaves tricycle and Edward takes it and rides it	108"	



EDWARD—12/6/28—DST

AB—Riding trike	114"	EF—Riding trike	30"
A ¹ B ¹ —Talks to Henry and Phyllis	—	GH—Goes back to Ann who is crying	27"
A ² B ² —Bumps into Nelson, pushes auto, talks to him	10"	IJ—Picks up cover and takes it over to Ann	48"
CD—Tries to intervene in quarrel to help Ruth	47"	I ¹ J ¹ —Teacher wipes nose	7"



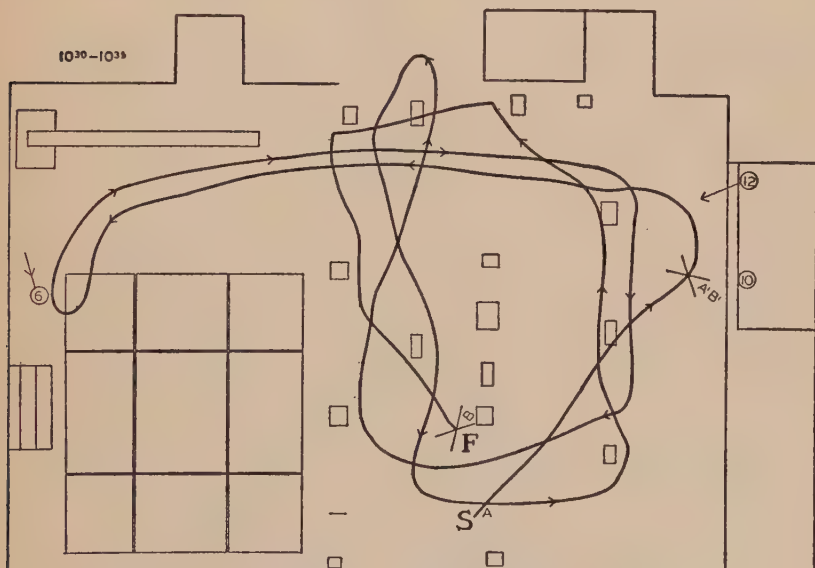
EDWARD—12/6/28—DST

AB—Tricycle (never gets off trike during whole activity)
 A'B'—Looks around at children
 A'B²—Looks at Alma and sits looking into hall

214"
 15"
 30"

A'B³—Looks at children
 A'B⁴—Looks at Henry and Alma
 A'B⁵—Henry follows him
 A'B⁶—Bumps into Oliver

5"
 22"
 12"
 2"

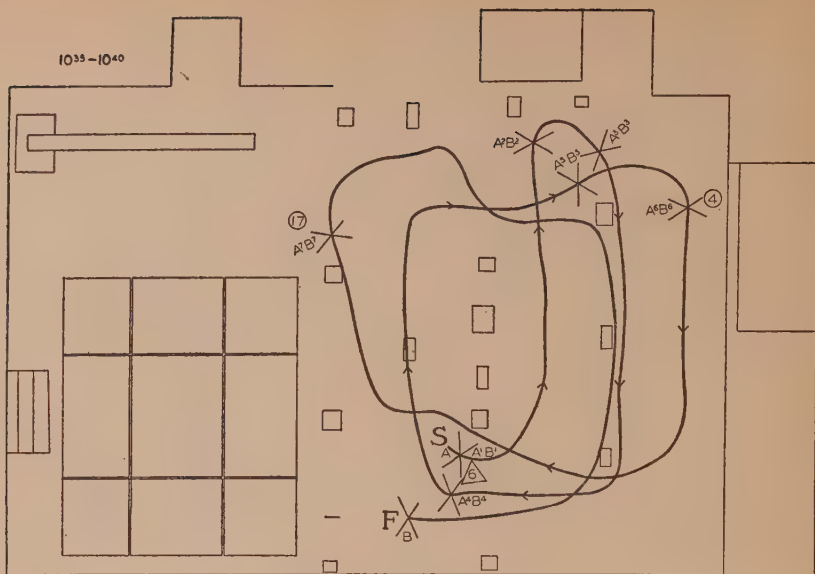


EDWARD—12/6/28—M. B.

AB—Tricycle. Martin follows him
 A'B'—Stops by Eric. Speaks to him. Then stands watching him

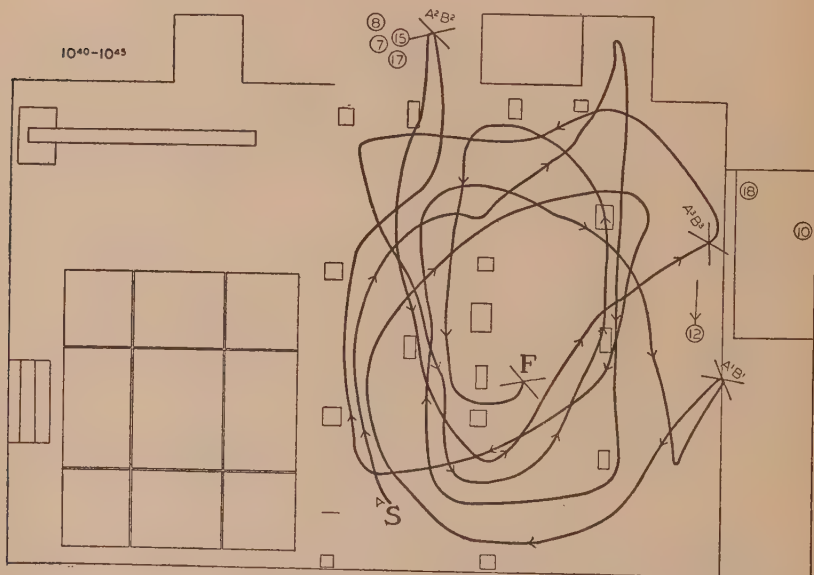
235"
 65"

Bumps into Mary. Goes on. Falls off hard. Laughs, gets up and on it again. Falls off again and laughs; gets on.



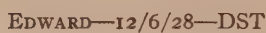
EDWARD—12/6/28—DST

- | | | | |
|--------------------------------------|-----|---|-----|
| AB—Tricycle | — | A4B4—Looks around at children | — |
| A1B1—Martin helps him to get up from | 15" | A5B4—Looks around at children | 25" |
| where he has fallen | 12" | A6B4—Stops by Phyllis and then looks at | 20" |
| A2B2—Conflict with Paul | 9" | children | — |
| A3B2—Looking around | — | A7B7—Knocks Judith over | — |
| | | Never gave up tricycle | |



EDWARD—12/6/28—M. B.

- | | | | |
|---------------------------------------|------|---------------------------------------|-----|
| AB—On tricycle. Riding, then gets | 240" | A2B2—Stops by group in hall. Looks at | 15" |
| off and pushes with one foot | | Judith | 35" |
| A1B1—Gets off tricycle. Rosalie takes | 10" | A3B3—Watches Eric | |
| it and he takes it back | | | |



A4B4—Talks to self. Bumps into Harold

17



EF—Helps put things away

55"

IJ—Oliver comes up and hits at him playfully. He hits back. Push each other down. Edward climbs on top of Oliver

39th

CHAPTER II

RELIABILITY OF TECHNIQUE

DISTANCE COVERED, SOCIAL CONTACTS, AND TIME OF ACTIVITIES

Observations were begun in February, 1927, and continued into May, 1927. Sixteen children were studied during that period. About 20 five-minute records were taken of each child, making a total of 366 five-minute records. There were four observers who worked in the six possible combinations of two observers at one time. A small number of simultaneous records were also taken by three pairs of observers on ten children during the fall and winter months of 1928-29. Upon these is based the study of reliability. Before presenting a statistical study of this reliability, mention should be made of the degree of independence of observers. They were near enough to be influenced somewhat, even though unconsciously, by one another—for instance, by the clicking of a stop watch. This, of course, makes the reliability spurious in so far as it occurred. We shall consider in turn the recording of distance covered, the timing of activities, and the number of social contacts listed.

Distance

As was stated above, the four observers worked in six different combinations. Let us call these AB, AC, CD, AD, BC, and BD. The distance covered by a child within a five-minute period was recorded independently, by two observers, on the charts of the floor plan which had been drawn to scale. A map measurer was used to ascertain the gross distance covered and these results were translated into their equivalent yards.

With the exception of the first-step interval, the scores tended to distribute themselves in a normal curve. This exception during the first-step interval can be attributed to inactivity in the sandpile. The children as a group spent more time there than with any other material and often no distance would be covered during a five-minute period. With other distributions, this deviation would undoubtedly occur but probably would not prevent the means of other dis-

14 *Studying the Social-Material Activities of Young Children*

tributions from arranging themselves somewhat according to a normal curve, which is the assumption made when this measure of the reliability of the means is used.

Starting with an approximate U-shaped population, as N increases from 2, the form of the distribution of means of samples of N should be first U, then J, then the shape of an ordinary Pearson Type I curve, and finally, when N is very large, normal in shape. . . .¹

The frequency of the scores for distance covered as recorded by A and B and by C and D is given in Table I.

TABLE I
DISTRIBUTION OF MEASURES FOR DISTANCE COVERED (YARDS)
(4 Observers—2 Pairs)

Number of Yards	Pair AB		Pair CD	
	A	B	C	D
0- 4	14	15	14	17
5- 9	5	7	5	5
10- 14	11	8	9	8
15- 19	6	7	10	10
20- 24	13	11	7	13
25- 29	14	17	7	6
30- 34	9	8	12	7
35- 39	3	1	10	10
40- 44	5	5	11	9
45- 49	3	4	4	4
50- 54	1	2	2	5
55- 59	1	0	6	1
60- 64	0	1	0	2
65- 69	1	0	1	4
70- 74	0	0	6	4
75- 79	0	0	2	0
80- 84	0	0	0	0
85- 89	0	0	1	0
90- 94	0	1	0	1
95- 99	0	0	0	0
100-104	1	0	0	0
105-109	0	0	0	1
TOTAL	87	87	107	107

¹ Holinger, K. J. and Church, A. E. R., "On the Means of Samples from a U-Shaped Population." *Biometrika*, Dec. 1928.

The scores obtained by two observers were paired. The correlation coefficient was found by the Pearson method and the significance of the differences of the means determined. In Table II we notice under "Observers" the combination AB. Reading across we find that the mean distance obtained by the first observer, A, is 11.31 yards; the mean of the second observer, B, is 11.10 yards. The standard deviation of the first observer is 8.05 and of the second 7.71. The correlation between the two is $.97 \pm .00$. The difference between the means divided by the standard error of the difference is 1.00. These figures are the result of 87 five-minute periods of observation. The results of the other pairs of observers may be read in like manner from the table.

TABLE II
AGREEMENT BETWEEN 6 PAIRS OF OBSERVERS AS TO
RECORDING DISTANCE COVERED (YARDS)

Observers First-Second	Mean		σ		r Observers' Measures for Five Minutes	$\frac{M_1 - M_2}{\sigma M_1 - M_2}$	Number of Five- Minute Observa- tions
	First Observer	Second Observer	First Observer	Second Observer			
A — B	11.31	11.10	8.05	7.71	$.97 \pm .00$	1.00	87
C — D	14.38	14.73	10.53	9.71	$.97 \pm .00$	1.39	107
A — D	12.99	14.36	9.21	10.05	$.98 \pm .01$	3.20	24
A — C	10.51	10.01	10.24	9.66	$.98 \pm .01$	1.27	28
B — C	9.94	9.94	9.33	9.89	$.98 \pm .00$	0.00	35
B — D	13.67	15.26	10.81	11.72	$.97 \pm .01$	3.59	43

The correlation coefficients—all .97 or .98—indicate a very high degree of reliability. The difference between the means divided by the standard error of the difference, however, shows a significant difference between observers AD and BD—3.20 and 3.59. With the three pairs AB, CD, and AC, this measure ranges from 1.00 to 1.39 while there is no difference between B and C. It would seem that A, B, and C can record distance reliably. D, on the other hand, appears to be unreliable when working with A and B. The difference is not so significant when she works with C. Inasmuch as C agrees with A and B it looks as though D *could* record reliably, but may not have been so careful in her later records with A and B. Her primary interest was in another problem at this period.

16 *Studying the Social-Material Activities of Young Children*

A third method for checking the reliability of observers was used. The mean score obtained by one observer for each of the sixteen children was calculated and the children ranked according to distance covered. They were ranked also from the means obtained by the observer working at the same time and the amount of agreement determined by the rank system of correlation. For observers A and B this correlation is $.96 \pm .01$ and for observers C and D, $.99 \pm .01$. It was not possible to find the rank correlations for the children for the other observers as the number of observations was too small. For instance, A and C had 28 five-minute periods together. As there were sixteen children sometimes no observations were made on a certain child while on others only one or two may have been made. On the basis of the two pairs, AB and CD, however, who had a much larger number of periods together, it does seem possible to rank children reliably from records indicating distance covered.

Before testing the reliability of observers, the amount of distance which they recorded had to be ascertained by measuring the lines they had drawn on the floor plan. A map measurer was the instrument used. To determine the error of instrument, the measurements of two people for a hundred cases were compared. The correlation is $.99 \pm .00$. The difference between the means divided by the standard errors of the difference is .00. The agreement on map measuring is very high.

During the fall and winter months of 1928-29, two new observers E and F, were compared with observer C to find out how well they agreed in the recording of distance. These results are given in Table III, which reads the same as Table II.

The correlations between the scores secured by C and E, and C and

TABLE III
AGREEMENT BETWEEN 2 PAIRS OF OBSERVERS AS TO
RECORDING DISTANCE COVERED (YARDS)

Observers	Mean		σ		r Observers' Measures for Five Minutes	$\frac{M_1 - M_2}{\sigma M_1 - M_2}$	Number of Five- Minute Observa- tions
	First Observer	Second Observer	First Observer	Second Observer			
C — E	9.42	7.80	5.17	3.53	$.89 \pm .03$	4.06	42
C — F	8.97	8.20	5.60	5.80	$.95 \pm .01$	2.82	44

F are high—.89 and .95—though both are lower than any obtained for observers in the first study of reliability. In both these cases the means are significantly different. The differences between the means divided by their standard errors are 4.06 and 2.82. The scores of E and F are almost without exception lower than the scores of C. There is a constant error in the method of recording, for which a correction could be made.

We may conclude, then, on the basis of these eight pairs of observers that it is possible for distance to be recorded reliably, but each new observer should be trained and tested.

Social Contacts

Not only participation in an activity, but sometimes spatial proximity was defined as a social contact. Verbal contact would be con-

TABLE IV

FREQUENCY TABLES OF MEASURES FOR NUMBER OF SOCIAL CONTACTS PER FIVE-MINUTE PERIOD FOR OBSERVERS AB AND CD

Number of Contacts	Pair AB		Pair CD	
	A	B	C	D
0	8	7	5	6
1	13	13	9	11
2	21	16	10	8
3	16	16	13	15
4	13	17	16	20
5	13	12	18	15
6	4	8	10	10
7	4	4	11	14
8	1	1	8	2
9	0	0	3	6
10	0	0	3	0
11	1	0	1	1
12	1	2	0	1
13	1	0	1	0
14	—	—	0	0
15	—	—	1	0
16	—	—	1	0
17	—	—	0	0
18	—	—	0	1
TOTAL	96	96	110	110

sidered participation. Spatial proximity was counted a social contact when the activity of two or more children near one another seemed definitely unconnected. This, of course, was a matter of interpretation and hence would be expected to lead to unreliability.

The scores for number of social contacts per five-minute period tend to distribute themselves somewhat in the form of a normal curve. The frequency tables of the scores obtained by observers A and B and observers C and D are given in Table IV.

The reliability of recording the number of social contacts may be ascertained from Table V. The reliability is not so high here as for distance covered. The correlations range from .47 to .80. The difference between the means divided by the standard error of the difference for A and B is .44, which is not very significant. For the other five pairs of observers, however, it is much higher, ranging from 1.04 for C and D to 4.49 for A and C. As A worked with B and C with D more than with any other observers, it looks as though a slightly different interpretation of what constitutes a social contact had been worked out by these two pairs.

TABLE V
AGREEMENT BETWEEN 6 PAIRS OF OBSERVERS AS TO NUMBER OF SOCIAL CONTACTS
PER FIVE-MINUTE PERIOD

Observers	Mean		σ		r Observers' Measures for Five Minutes	$\frac{M_1 - M_2}{\sigma M_1 - M_2}$	Number of Five- Minute Observa- tions
	First Observer	Second Observer	First Observer	Second Observer			
A — B	3.31	3.46	2.40	3.69	.47 $\pm$.04	.44	96
C — D	4.72	4.52	3.09	2.81	.61 $\pm$.05	1.04	110
A — D	4.61	5.71	2.19	2.64	.52 $\pm$.03	2.44	28
A — C	4.54	6.29	2.87	3.34	.80 $\pm$.05	4.49	28
B — C	6.03	4.38	3.38	2.40	.74 $\pm$.05	4.23	35
B — D	4.21	5.21	2.82	3.40	.68 $\pm$.09	2.69	47

The reliability of these two pairs was tested also by comparing the ranks of children on the basis of the mean number of social contacts assigned them by the two observers taking records simultaneously. The correlation for observers A and B is .73 $\pm$.07 as compared with a correlation of .47 $\pm$.04 when number of social contacts per five-minute period were compared for the group as a whole. With ob-

servers C and D the correlation for the ranking which they gave the children according to the mean number of social contacts is $.43 \pm .14$, whereas when the five-minute periods of the group as a whole were compared the correlation was $.61 \pm .05$.

During the fall and winter months of 1928-29, the two new observers, E and F, were tested and A and C retested. Table VI indicates that the reliability of E and F with observer C is about the same as that for C with A, B, and D in the first study. The correlation coefficients are $.61 \pm .07$ and $.78 \pm .04$. The difference between the means of C and E is significant. The difference between the means divided by the standard error of the difference is 3.66. With C and F it is 1.29, which shows better agreement. A and C were retested but the comparison is based upon only 24 five-minute periods. Their correlation coefficient here is $.78 \pm .04$, which is about the same as in the first study, where it was $.80 \pm .05$. In this second comparison the difference between the means is probably not significant for when it is divided by the standard error of the difference the result is .67, whereas before it was 4.49. Indicating the children by number instead of by name may have contributed to more accurate recording in the second study.

TABLE VI
AGREEMENT BETWEEN 2 PAIRS OF OBSERVERS AS TO
RECORDING NUMBER OF SOCIAL CONTACTS

Observers	Mean		σ		r Observers' Measures for Five Minutes	$\frac{M_1 - M_2}{\sigma M_1 - M_2}$	Number of Five- Minute Period
	First Observer	Second Observer	First Observer	Second Observer			
C — E	4.31	3.14	2.54	2.03	$.61 \pm .07$	3.66	42
C — F	4.95	4.64	2.43	2.25	$.78 \pm .04$	1.29	44
A — C	5.21	5.46	2.88	2.72	$.79 \pm .05$	.67	24

Considering all eight pairs of observers once and the one pair (AC) a second time when retested, the correlations for the number of social contacts recorded range from .47 to .80. With three pairs of observers the means are significantly different; with two pairs they are probably not, while the other four pairs lie somewhere between the difference between the means divided by the standard error of the difference

ranging from 1.04 to 2.44. Interpretation of what constitutes a social contact is probably a factor which lowers reliability. It is also lowered, no doubt, by division of the attention of observers because of trying to note accurately other phases of activity at the same time.

Time

In similar fashion the reliability of observers was determined in respect to their timing of children's activities. The times secured by each of two observers were paired. If one observer broke an activity into two parts, whereas the other considered it one, the times paired were the sum of the times obtained for the two activities in the one case, with time for the total activity in the other case. This difference between observers in the division of activities causes some difficulty in determining true reliability. Let us give an example:

First Observer (re Edward)

Activity AB—Lies on Beatrice's truck. She pulls him but protests.	He
pulls truck away from her. Holds it and pats dog.	92"

Second Observer (re Edward)

Activity AB—Playing with auto truck with Beatrice	71"
Activity AB—Holds truck and pats dog	20"

The reliability results were determined by combining the ninety-two seconds of Observer I with the ninety-one seconds of Observer II. If Observer I had timed the activity with the dog separately the reliability might have been quite different.

A further difficulty arose through the fact that the time was sometimes omitted by both observers and an activity of very brief duration was recorded by one and not by the other. Obviously these activities could not be included in the study of time reliability and, therefore, the results are, to some degree, unrepresentative. Activities of five minutes' duration were omitted because in these cases there was perfect agreement of the observers which was attributable to the fact that the period of observation was five minutes long. This occurred in only 6 per cent of the cases. In 24 per cent of the cases the time was not recorded by either observer; in 9 per cent it was noted by one and not by the other. The reliability is, therefore, based on only 61 per cent of all the activities recorded. The frequency tables of scores on time as obtained by A and B and by C and D are given in Table VII. These scores do not even tend to distribute

themselves in a normal curve. The largest number of activities tends to fall within the first ten seconds and then the number decreases as the time period increases.

TABLE VII

DISTRIBUTION OF MEASURES IN SECONDS SECURED BY OBSERVERS AB AND CD
IN TIMING ACTIVITIES

Number of Seconds	Pair AB		Pair CD	
	A	B	C	D
1- 10	28	21	23	16
11- 20	24	29	16	22
21- 30	21	21	16	14
31- 40	23	26	7	10
41- 50	22	16	9	11
51- 60	18	18	11	9
61- 70	11	12	4	6
71- 80	5	14	7	3
81- 90	6	5	2	3
91-100	7	4	3	2
101-110	6	7	1	4
111-120	5	6	2	2
121-130	10	9	4	4
131-140	7	4	1	1
141-150	8	8	4	3
151-160	5	5	3	2
161-170	3	5	2	0
171-180	2	3	3	1
181-190	4	2	3	8
191-200	2	4	4	3
201-210	3	3	1	1
211-220	2	0	1	1
221-230	2	3	4	3
231-240	4	2	1	1
241-250	0	2	1	1
251-260	2	2	—	—
261-270	2	0	—	—
271-280	1	1	—	2
281-290	1	2	—	—
291-300	—	—	—	—
Total	234	234	133	133

The times for the activities as obtained by the different combinations of observers were paired and the correlations calculated by the Pearson method. The results given in Table VIII apparently indicate

a high degree of reliability correlations ranging from .93 to .98. The differences between the means divided by the standard errors of the differences range from 0 to 1.48. As mentioned above, however, this may not be a true reliability for single activities. If activities had not been combined, the time would have been shortened.

Table IX throws some light on the difference it might make in reliability by determining the agreement of observers when recording time for activities of less than one, two, three, four, or five minutes' duration. When the activities were divided in this manner there were too few cases in the four- and five-minute groups from which to draw accurate conclusions. In order to have as many in each group as possible the times of first observer were compared with the times of second observer in combinations AB, AC, and AD. The other pairs could not be used as the addition of these groups would make one person first observer in some cases and second observer in others. The relationship was determined by the Pearson r for the one-, two-, and three-minute groups and by the rank system of correlation for the four- and five-minute groups.

While the correlation for the one-minute group is $.89 \pm .01$, that for the two-, three-, four-, and five-minute groups ranges from .63 to .79. We may conclude, therefore, that the timing of activities of less than one minute's duration is slightly more accurate than that for longer intervals.

TABLE VIII
AGREEMENT BETWEEN 6 PAIRS OF OBSERVERS AS TO
TIME ON ACTIVITIES

Observers	Mean		σ		r	$M_1 - M_2$	Number of Five-Minute Observations
First-Second	First Observer	Second Observer	First Observer	Second Observer	Observers' Measures for Five Minutes	$\sigma M_1 - M_2$	
A — B	88.50	88.50	70.71	90.91	.93 $\pm$.01	0	234
C — D	88.71	90.14	66.66	69.91	.95 $\pm$.01	.76	133
A — D	95.71	95.53	71.93	76.29	.98 $\pm$.00	.09	58
A — C	90.88	88.29	58.03	59.77	.94 $\pm$.01	.96	58
B — C	88.57	92.28	66.50	71.84	.95 $\pm$.01	1.48	81
B — D	79.63	79.63	70.77	70.72	.98 $\pm$.00	0	119

TABLE IX

AGREEMENT BETWEEN 6 PAIRS OF OBSERVERS AS TO RECORDING TIME ACCORDING TO LENGTH OF OBSERVATION

Time in Seconds	Mean		σ		r Observers' Measures for Five Minutes	Number of Activities
	First Observer	Second Observer	First Observer	Second Observer		
0- 59	26.26	27.14	15.46	15.37	.89 $\pm$.01	230
60-119	22.39	23.06	17.31	17.18	.79 $\pm$.03	54
120-179	21.79	25.79	15.26	15.29	.71 $\pm$.05	41
180-239	23.28	27.87	16.22	15.41	.63 $\pm$.08	27
240-299	19.64	26.73	12.71	16.41	.77 $\pm$.08	13

The reliability was again measured by ranking the sixteen children according to the mean time on activities obtained by two observers working together and determining agreement by the rank system of correlation. The means of observers A and B were compared and those of C and D. The correlation for A and B is $.91 \pm .03$ and for C and D $.91 \pm .01$. Both in ranking children and comparing scores of observers for the group considered as a whole we have high reliability in timing.

During the fall and winter months of 1929-30, a further study was made of the reliability of observers in timing activities. Table X shows the comparison of four observers, AC, CE, and CF, working in three combinations while taking five-minute records simultaneously. A and C are the A and C of the earlier study. E and F are two new people. The times secured on activities were paired. The material used for examining reliability is not completely representative but much more so than that in the earlier study made while the technique was being developed. Then the figures were based upon only 61 per cent of the activities. Here, with observers AC it is based on 99 per cent; with observers CE, on 93 per cent; and with observers CF, on 82 per cent. The 1 per cent omitted by observers AC comprised only five-minute activities, the inclusion of which would have made the correlation spurious because perfect agreement was inevitable. The 7 per cent omitted by observers CE comprised 1 per cent of five-minute activities and 6 per cent of activities for which the time was recorded by only one observer. The 18 per cent

24 *Studying the Social-Material Activities of Young Children*

omitted by observers CF comprised 2 per cent of activities five minutes long, 1 per cent of activities for which the time was recorded by neither observer and 15 per cent for which the time was recorded by one and not by the other. As before, activities of very short duration were sometimes recorded by one observer and not by the other, but the total of such activities is only a small proportion of the total time. During only 62 per cent of the time were activities timed as units. In other words, 38 per cent of the time observers combined two or more activities according to the classification used which will be discussed later.

TABLE X
AGREEMENT BETWEEN OBSERVERS (3 PAIRS) AS TO
TIME ON ACTIVITIES

Observers	Mean		σ		r Observers' Measures for Five Minutes	$M_1 - M_2$ $\sigma_{M_1 - M_2}$	Number of Activities
	First Observer	Second Observer	First Observer	Second Observer			
A — C	58.46	58.15	60.01	57.77	.98 $\pm$.00	.25	96
C — E	52.60	51.57	48.34	46.84	.95 $\pm$.00	.68	101
C — F	55.50	54.38	57.83	57.01	.98 $\pm$.00	.88	80

All these correlations are very high, .95 to .98. The differences between the means divided by their standard errors are .25, .68, and .88. If the units timed are combined, when one observer classes it as two activities, whereas the other considers it only one, the reliability of all observers in both studies made is very high in the timing of activities, but the results are of little value if the timing does not follow a definite classification of the activities, for otherwise norms for the group cannot be determined or individual differences ascertained.

The representativeness of the material has been mentioned in connection with both studies of time reliability. Additional information on this subject was secured from 999 five-minute records taken by single observers during the fall and winter of 1928-29 in studying ten children. Of these, 12 per cent contained untimed activities. An analysis of these untimed activities reveals the fact that three-fourths of the ones untimed contain an activity occurring within an

activity. A child playing in the sandpile, for instance, may have a conflict with another child and then return to the sandpile activity or he may continue to play with sand and look at or speak to another child part of the time. The attempt of the observer to take time out to record an activity occurring within an activity was not successful. A stop watch indicating split seconds should be used for this purpose. In only 3 per cent of the cases were observers unsuccessful in securing the time on ordinary activities. About 7 per cent of the time, or an average of 21 seconds out of every five-minute period, was untimed. The very brief periods occurring at the close of one activity before another began, when the child seemed to walk about aimlessly, were also untimed.

The question arises as to how well observers agree upon number of activities they record. Before discussing this matter, however, let us turn to the kind of classification used.

CHAPTER III

RELIABILITY OF TECHNIQUE (*Continued*)

NUMBER OF ACTIVITIES

The work on the classification of activities divides itself into two parts. The first classification was made on the basis of the 366 five-minute records taken on sixteen children during the year 1927-28. The one finally adopted was developed from 1,000 five-minute records on ten children. These observations were made during the fall and winter of 1928-29.

The material equipment with which the children came in contact is named in the following list:

Auto	Crayons	Leaves	Snow shovel
Awning rope	Cup	Lock	Steps
Ball	Curtain cord	Mat	Stick
Basket	Dishes	Mirror	Stones
Bear	Dog	Mop	Stool
Bed	Doll	Nail	String
Bench	Doll carriage	Pail	Suitcase
Boards (Building)	Doors	Pan	Swing
Boards (Walking)	Doll blanket	Paper	Table
Book	Doll cap	Parasol	Telephone
Box	Doll chest	Pencil	Thermometer
Broom	Drinking fountain	Piano	Tinker toy
Brush	Drum	Picture	Train
Bucket	Dumb-bell	Pitcher	Tricycle
Bureau	Dust pan	Platform	Trowel
Can	Flowers	Purse	Truck
Car	Hammer	Sandpile	Victrola
Cart	Horse	Shavings	Wagon
Castor	Ice	Sill	Waste can
Chair	Jungle gym	Slide	Wheelbarrow
Closet	Keg	Shells	Window opener
Cover	Kiddie Kar	Shelves	

The first attempt to classify the activities resulted in 15 groups:

- I Looking around.
Sitting in wagon, etc.

- Sitting on chair, etc.
- Lying on back, etc.
- Standing by person or thing.
- Daydreaming.
- Sucking finger.
- II Sandbox.
- III Manipulation of small toys and other objects—
 - Rocks in chair, pushes doll carriage, spins wheels of tricycle.
- IV Talking to persons.
 - Showing things to persons.
 - Smiling at persons.
 - Laughing at persons.
 - Directing persons.
- V (a) Looking at persons.
 - Going up to persons.(b) Looking at things.
 - Going up to things.
 - Listening to story, music, etc.
 - Looking in cupboard, etc.
- VI Activity of big muscles—
 - Jungle gym, walking board, swing, slide, carrying blocks, kiddie kar, pulling big wagon, climbing steps.
- VII Hammering.
- VIII Activity in closets and boxes.
- IX (a) Things done for the child by another person—
 - Nose wiped.
 - Pulled in wagon, etc.
 - Directed by teacher or child.
 - Led by teacher or child.
 - Comforted by another.
 - Teacher intervenes in behalf of child.
 - Teacher or child helps another.(b) Things are taken from child by child (No defensive reaction).
 - Teacher intervenes in behalf of another.(c) Things are given to child by another.
- X Conflicts.
 - Aggressive or defensive contacts.

- XI Accidents.
- XII (a) Teasing actions.
(b) Friendly contacts—
Embraces someone, helps someone, laughs with someone, plays with someone, follows someone.
- XIII Talks to self.
Sings.
Laughs by self.
Looks at self in mirror.
- XIV Cries.
Screams.
Whimpers.
- XV Attends to own wants—
Wipes nose, brushes sand off hands, arranges mittens, etc.

The activities may also be grouped as those pertaining to *self*,¹ *social activities*,² *material*³ and *miscellaneous*⁴ and the various combinations of these: *Self and social*, *material and social*, and *self and material*.

This classification was discarded because it did not divide the activities of the child into mutually exclusive categories and involved observations difficult to interpret. It was impossible to distinguish accurately different degrees of activity as indicated by the use of small or large objects or of small or large muscles. The distinction between contacts made by one child and those made by other children was retained in the final classification only for verbal and physical contacts when it was objectively possible to determine by whom the contact was made.

FINAL CLASSIFICATION

The classification finally adopted is based upon 1,000 five-minute records taken on ten children during 1928-29. Most of these records were obtained on the roof as during the first study. Some, however, were taken in the two playrooms downstairs. This change in location causes some difficulty in determining the relative amount of different kinds of activity. This will be considered later. It does not interfere, however, with the classification. Two observers took alternate records on a child, that is, one observer recorded one five-

¹ Self—I, XIII, XIV, XV

² Social—IV, Va, IX, X, XII

³ Material—II, III, Va, VI, VII, VIII

⁴ Miscellaneous—XI

minute period and the other observer the next. In this way a continuous series was secured. Usually one child was studied throughout the morning, but interruptions occurred and the actual length of time varies from ten minutes to one hour and forty minutes, the average being one hour. The interval between daily observations of the same child varied from one day to two months, though the attempt was made to observe him once every two weeks. Illness more than any other one thing upset the schedule. This final classification follows:

I. Material

A. *Social*

1. Observation of material with others, and of persons using material, and listening to story, music, etc.
2. Approach to material with others, or to material used by others.
3. Contact with material, in functional or spatial contact with persons.
 - a. Accidents
 - b. Use of material with others.

B. *Nonsocial*

1. Observation of material alone.
2. Approach to material alone.
3. Contact with material alone.
 - a. Accidents.
 - b. Use of material.

II. Nonmaterial

A. *Social*

1. Observation of persons.
2. Approach to persons, following persons.
3. Verbal contact.
 - a. Made by child.
 - b. Made by others.
4. Physical contact.
5. Laughing, vocalizing, with others.
6. Spatial contact.

Running around with others, standing at elevator with others.
7. Approached by others.

B. *Nonsocial*

1. Daydreaming.
2. Talking to self, singing by self, talking to toys.
3. Crying, screaming.
4. Kicking, crawling, rolling on floor, by self.

The categories indicated above by Roman numerals seemed at first to be mutually exclusive. There are four big groups.

IA. Material-Social.

IIA. Material-Nonsocial (Purely material).

IB. Nonmaterial-Social (Purely social).

IIB. Nonmaterial-Nonsocial (Self).

In practice the observers did not succeed in timing activities according to these categories in a great many cases. Of the 1,000 five-minute periods 756 contain one or more activities which had to be classified under two or more of these groups. Of 100 such activities selected at random 39 per cent were classified under both I A, material-social and II A, nonmaterial-social. In other words, it was difficult to separate the purely social from the material-social. This is partly due to failure of the observer to time activities separately, for example:

Sees Mary pushing barrel. Joins her and tries to roll it. . . 40"

"Sees Mary pushing barrel" is IA-1, Material-Social, observation of material with others. "Joins her" is IIA-2, Nonmaterial-Social, approach to persons. "Tries to roll it" is IA-3-b, Material-Social, use of material with others.

Failure to time activities separately is sometimes due not to the observer, but to the nature of the situation itself. Let us give another example:

Sitting on slide and watching children. . . 28"

Here two things go on together though one lasts longer than the other. The child continued to sit on the slide for 28", but only watched other children a part of that time, hence the observer did not stop her watch. She could have noted the time when the "watching children" began and have subtracted this amount from 28 seconds, the total time when she snapped her watch at the end as was done for interludes in activities, but this is difficult to do and not very satisfactory as was pointed out when discussing the representativeness of the material recorded.

Whereas 39 per cent of the activities combined were social-material with purely social, the next largest group, 22 per cent, was caused by the failure to separate the purely social from the purely material. For example:

Plays with truck. George joins him. . . 128"

"Plays with truck" is IB-3-b, Material-Nonsocial, use of material. "George joins him" is IIA-7, Nonmaterial-Social, approached by others. This is a case like the one described above of two activities occurring simultaneously, but with one lasting longer than the other.

It seems that in one of these complex activities, the material rather than the social is more often made the unit of observation. In the last example, for instance, accurate time was kept for the playing with the truck, but how long the other child was with the child observed is uncertain.

To what extent do observers vary in the number of activities they record? This is an important question, for combining the time on activities when one observer records something as two different activities in order to compare it with the time when another observer considers the same activity as one may give a rough indication of reliability in timing, but is not of much use when one wishes to consider distribution of activities and individual differences. Unfortunately the number of simultaneous observations made during 1928-29 when this classification was evolved was small. There were three combinations of two observers AC, CE, and CF. C and E worked together for 42 five-minute periods; C and F for 44; and A and C for 24. These results are presented in Table XI. The agreement between observers as to number of activities recorded per five-minute period ranges from $.60 \pm .06$ to $.87 \pm .04$, as measured by the correlation coefficient. The differences between the means divided by the standard errors of the differences range from 1.77 to 2.90. A and C have the least significant difference. This is what one would expect of the observers as they had more practice in recording. However, it should be remembered that the figures for A and C are based upon a comparison of only 24 five-minute periods.

In Table XI the agreement of observers is shown when the number of activities is divided according to kind of activity. This comparison is made for number of social, number of material and number of social-material activities. Too few self activities occur during a five-minute interval to compare observers in this respect. We do not find that there is consistently better agreement for any one kind

TABLE XI

AGREEMENT OF OBSERVERS (3 PAIRS) AS TO NUMBER OF ACTIVITIES PER FIVE-MINUTE PERIOD

Observers	Mean		σ		r Observer's Measures for Five Minutes	$\frac{M_1 - M_2}{\sigma_{M_1 - M_2}}$	Number of Five- Minute Observa- tions
	First Observer	Second Observer	First Observer	Second Observer			
C — E	8.60	6.48	2.56	1.73	.61 $\pm$.07	2.90	42
C — F	7.90	7.13	2.57	1.53	.60 $\pm$.06	2.49	44
A — C	6.63	7.21	3.14	3.14	.87 $\pm$.04	1.77	24

of activity. The highest correlation coefficients, $.71 \pm .06$ and $.71 \pm .05$ are for number of material activities, but the lowest correlation is also to be found in this group, $.53 \pm .09$. However, when the difference between the means is divided by the standard error of the difference, material activities show the least significant difference, ranging only from .19 to .51. One pair of observers, CE, shows

TABLE XIA

AGREEMENT BETWEEN OBSERVERS (3 PAIRS) AS TO NUMBER OF DIFFERENT KINDS OF ACTIVITIES

Kind of Activity	Observers	Mean		σ		r Observer's Measures for Five Minutes	$\frac{M_1 - M_2}{\sigma_{M_1 - M_2}}$	Number of Five- Minute Observa- tions
		First Ob- server	Second Ob- server	First Ob- server	Second Ob- server			
Social- material activity	A — C	1.67	2.04	.94	1.57	.59 $\pm$.09	.90	24
	C — E	2.52	1.95	1.50	1.22	.54 $\pm$.08	2.04	42
	C — F	2.33	2.03	1.19	1.24	.62 $\pm$.07	1.50	40
Social activity	A — C	2.54	2.83	2.38	2.48	.60 $\pm$.09	.27	24
	C — E	2.62	1.29	1.63	1.32	.46 $\pm$.08	3.59	42
	C — F	3.43	2.63	2.09	1.50	.46 $\pm$.08	1.29	40
Material activity	A — C	2.33	2.13	1.70	1.58	.76 $\pm$.06	.51	24
	C — E	3.10	3.21	2.25	2.16	.71 $\pm$.05	.19	42
	C — F	1.90	1.98	1.55	1.32	.43 $\pm$.09	.23	40

a significant difference in recording social activity, the difference between the means divided by the standard error of the difference being 3.58, but using this same measure for another pair of observers .27 results, which indicates that the difference is not significant.

Difference in agreement is apparently due to the varying ability of the observers rather than to the kind of measure except for slight evidence in favor of material activities.

Let us consider some other difficulties in classifying. Certain activities were often described very indefinitely by observers. Some arbitrary decisions had to be made, therefore, during the classification. "Looking around," "looking out into the hall," "looking at Mary on the slide," were classified as observation of persons and things; "looking out over the roof" as observation of material. The difficulty comes in deciding whether a child is looking at material, persons, or a combination of the two.

Physical contacts were made to include not only the obvious ones such as pushing, hitting, embracing, fighting, and the like, but also acts performed for the child by the teacher, as nose wiping and arranging clothes. In this group also were placed some activities that should logically have been classified as "use of material with person." If material taken by one person from another or handed from one person to another was small enough to make physical contact almost inevitable, it was placed under physical contact. There should have been another sub-classification under social-material where such physical contacts would go. One exception to this rule was made for activity with the swing. When one child tried to take it from another, physical contact was almost inevitable.

Under spatial contacts were classified those activities of the child with other children or with adults which did not involve material equipment, as, for instance, running around together, crawling together, smiling at people, and sitting or standing near people.

Intervention on the part of the teacher was arbitrarily recorded as a verbal contact because the verbal element was invariably present, whether the contact was also physical or not.

The results presented in Tables XII and XIII are based upon an analysis according to the categories mentioned above of 1,000 five-minute records of the social-material activities of ten nursery school children between two and three years of age. The distribution of activities according to frequency of occurrence is shown in Table XII. Accidents were grouped separately, although they involved persons and things, because they are not spontaneous activity.

TABLE XII
FREQUENCY DISTRIBUTION OF ACTIVITIES DURING 1,000 FIVE-MINUTE PERIODS

Main Classification	Social-Material IA				Material IB				Social IIA						Self IIB				Acci- dents	Total	
*Sub-classification	1	2	3	Total	1	2	3	Total	1	2	3	4	5 & 6	Total	1	2	3	4	Total		
Number of activities ...	444	134	168	2,196	84	88	1,943	2,115	476	224	593	573	205	2,071	41	97	69	66	273	83	6,738
Percent of total number,				32.59										30.74					4.05	1.23	100.00

* See chart of final classification of activities.

A total of 6,738 activities were classified. Of these, approximately 33 per cent were social-material; 31 per cent material; 31 per cent social; 5 per cent concerned with self; and 1 per cent were accidents. The activities are very evenly divided among material, social, and social-material—about one-third belonging to each group—whereas only a small proportion, 5 per cent, are nonmaterial-nonsocial activities having to do with self. It must be remembered, however, that there is a great deal of interpretation in regard to observation of persons and approach to persons (IIA-1 and -2), deciding whether such activities are purely social, or whether they are observation of material with others, or approach to material with others (IA-1 and -2). This is a decided weakness of the classification. It is difficult to tell how much these arbitrary decisions affect the total distribution.

The percentage of distribution of the sub-activities for the group according to frequency of occurrence was as follows:

SUB-ACTIVITIES	PER CENT
Use of material alone	29
Use of material with others	24
Looking	15
Talking to others	9
Physical contacts	8
Going to persons or things	7
Spatial contacts	3
Talking to self	1
Daydreaming	1
Crying, screaming	1
Kicking, crawling, etc.	1
Accidents	1

It is more difficult to determine the proportionate amount of time devoted to these different classes of activity because, as was mentioned, before, the time was often secured on a combination of activities according to the classification. The sub-classification was dropped, therefore, and the time for social-material, material, social and self activities only and their various combinations was obtained. These figures are not based on the *entire* 1,000 five-minute periods. Any record which had the time omitted on an activity was thrown out. This happened with 12 per cent of the records. Table XIII presents the distribution of activities according to time.

With the exception of groups IA and IIA, none of the combinations of activities comprise a large proportion of the time and hence

TABLE XIII
TIME DISTRIBUTION OF ACTIVITIES DURING 1,000 FIVE-MINUTE PERIODS

Classification of Activities	IA*	IB†	IIA‡	IIB§	IA IAA	IA IB	IA IIB	IA IIB	IA IIB	IA IIB	IA IIB	IA IIB	IA IIB	IA IIB	IA IIB	IA IIB	IA IIB	IA IIB	IA IIB	Total
Time in seconds . .	70,326	18,567	52,166	1,688	31,460	8,025	3,442	8,408	1,137	3,158	6,404	2,188	1,120	1,621	1,417					211,127
Per cent of total time	33.31	8.79	24.71	.71	14.90	3.98	1.63	3.98	.54	1.50	3.03	1.03	.53	.77	.67					100.08

* IA — Social-Material

† IB — Material

‡ IIA — Social

§ IIB — Self

would probably not affect seriously the proportionate distribution of time. About 15 per cent of the time is devoted to IA and IIA, activities where the observers failed to separate the social and the social-material. As both these groups absorb more of the time than material activities or those concerned with self, it is certain that they would continue to be first and second from the point of view of time. It looks as though the social-material would hold first rank, but this is uncertain.

According to the ten children studied in this particular situation it seems that the greatest amount of time is spent upon an activity involving both the social and material aspects. A purely social activity is next, the purely material third while activities having to do with self are shortest as well as least frequent in occurrence. From the point of view of frequency of occurrence, material activities rank almost as high as social-material and social, but the time on these is very much shorter. They comprise almost 32 per cent from the point of view of number, but only 9 per cent from the point of view of time. This is the only departure from the average time per activity that is very outstanding. The difference in social activities is probably accounted for by the omission of part of the time because of combinations as explained above.

This analysis of the classification of activities reveals two outstanding weaknesses of the technique. First, the diary method of recording is too slow. Second, the observer is asked to look for too much. Social, material, social-material, and self activity comprise practically all response except that of speech. Failure in timing activities one-third of the time as mentioned before is one indication of this. Poor agreement between observers in number of activities gives further evidence. Jenkins pointed out the difficulty of diary recording with speech. She set up an artificial situation in order to obtain an accurate measure of the degree of correctness of both students and stenographers. The stenographers did better than the students, but even their records showed discrepancies. She says:

The stenographers got 85 per cent of the entire conversation including the test directions, practically all of the "important" incidental conversation and about half of the predetermined action in the test situation.¹

¹ Jenkins, Lulu-Marie, "A Study of the Reliability of Stenographers' and Students' Reports on Psychological Tests," in *Some New Techniques for Studying Social Behavior* by Dorothy Swaine Thomas and Associates. Bureau of Publications, Teachers College, 1929.

38 *Studying the Social-Material Activities of Young Children*

A code should be used as a substitute for the diary method and the observation of either social or material response at one time seems a big enough job for one person. If the social-material activity is to be secured, it will necessitate two people working at the same time and then combining the results.

CHAPTER IV

SOME FACTORS INFLUENCING OBSERVATIONS

We may be able to record certain observations of children reliably, but if certain factors influence the activity under observation, the records obtained cannot be compared with those of other children unless the same conditions prevail or are taken into account. Some of the factors to be considered are temperature, humidity, change occurring over a period of time, and location. Let us consider these in turn.

TEMPERATURE

During observations made on the roof, the temperature ranged from 13 degrees Fahrenheit to 78 degrees. These figures were obtained from *The Monthly Meteorological Summary* of the U. S. Department of Agriculture Weather Bureau, 17 Battery Place, New York City. The temperature is reported for every hour. The nine, ten, and eleven o'clock temperatures were averaged, since the children were on the roof from nine to eleven. The relationship between temperature, distance covered, number of social contacts, number of activities and distribution of activities according to frequency of occurrence was determined for observations made during the months of October and November by A and C, the observers who had the most practice. The temperature range was from 27 to 72 degrees Fahrenheit. Attention should be called to the fact that the 281 observations were made within 21 days. If ten records were taken on a certain day, the temperature for that day was repeated ten times. Table XIV indicates this relationship by means of the Pearson correlation coefficient.

Temperature seems to have the greatest influence upon the number of activities. There is a very slight negative relationship, $-.19 \pm .04$ between temperature and number of social contacts. With distribution of activities according to frequency of occurrence, the relationship is also a very slight negative one, the highest $-.23 \pm .04$ for number of social activities and the lowest $-.01 \pm .04$

TABLE XIV
RELATIONSHIP OF TEMPERATURE TO
OTHER FACTORS

Other Factors	Temperature-Measures for Five Minutes	Number of Five-Minute Periods
Number of activities	$-.53 \pm .03$	281
Distance covered	$-.42 \pm .03$	281
Number of social contacts	$-.19 \pm .04$	281
Number of social activities	$-.23 \pm .04$	281
Number of social-material activities	$-.16 \pm .04$	281
Number of material activities	$-.01 \pm .04$	281

for the number of material activities. With distance covered the correlation is $-.53 \pm .03$ and with number of activities $-.42 \pm .03$. Does this relationship exist throughout the entire temperature range? To discover this, scores for these last two measures were compared with the lower, middle, and upper part of the temperature scale.

Table XIV-A shows that there is no relationship between temperature and distance covered unless the entire temperature range is used. The correlations are $.10 \pm .08$ for days between 27 and 40 degrees; $.00 \pm .06$ between 40 and 50 degrees and $-.09 \pm .08$ for those between 52 and 72 degrees. With number of activities, however, there is a relationship for the upper end of the scale. The lower and middle part yield correlations of $.08 \pm .08$ and $.09 \pm .06$, but as the temperature rises above 52 degrees we get a correlation

TABLE XIV-A
RELATIONSHIP OF TEMPERATURE TO DISTANCE COVERED AND NUMBER OF ACTIVITIES

	Entire Temperature Range 27-72 degrees	Temperature 27-40 degrees	Temperature 40-50 degrees	Temperature 52-72 degrees
Distance covered ..	$-.42 \pm .03$	$.10 \pm .08$	$.00 \pm .06$	$-.09 \pm .08$
Number of activities	$-.53 \pm .03$	$.08 \pm .08$	$.09 \pm .06$	$-.67 \pm .05$

of $-.67 \pm .05$. In other words, the warmer the weather above 52 degrees, the smaller the number of activities. Children seem to stay with an activity longer, the higher the temperature above this point.

HUMIDITY

The figures for humidity were likewise obtained from *The Monthly Meteorological Summary*. Three readings a day are given, 8 A.M., 12 noon and 8 P.M. The 8 A.M. and 12 noon figures were averaged and the relationship to distance covered, number of social contacts, number of activities and distribution of activities calculated as they were in relation to temperature. Table XV shows that there is a zero relationship between humidity and any of the other factors for the 281 five-minute observations made on the roof during the months of October and November.

The relationship between humidity and temperature during these 281 observations was also determined. The correlation is $.21 \pm .04$. It was mentioned before that the 281 observations were made during only 21 days. In order to find out how good a sampling this is of the relationship between humidity and temperature, these two factors were compared for a period of more than eleven weeks, October 1 to December 20, inclusive, a total of 81 days. This correlation is $.30 \pm .07$. This is slightly higher than for the 21-days' sample, but within the limits of the P.E. Huntington says:

The average humidity of the outside air from season to season does not vary in such a way as to cause maxima in May and November and minima in January

TABLE XV
RELATIONSHIP OF HUMIDITY TO
OTHER FACTORS

Other Factors	r Humidity- Measures for Five Minutes	Number of Five-Minute Periods
Number of activities	$-.06 \pm .04$	281
Distance covered	$-.06 \pm .04$	281
Number of social contacts	$+.03 \pm .04$	281
Number of social activities	$-.04 \pm .04$	281
Number of social-material activities	$+.05 \pm .04$	281
Number of material activities	$-.01 \pm .04$	281

42 *Studying the Social-Material Activities of Young Children*

and July. The average humidity of the outside air in November and in January is not greatly different.¹

Huntington studied the effect of climatic conditions upon the output of a large number of factory operatives. He found that humidity possessed considerable importance, but that temperature had more effect upon physical activity.

CHANGE OVER A PERIOD OF TIME

Observations were begun in October, 1928, and continued through the middle of April, 1929. Does a change occur during that time in the distance covered, the number of social contacts and the number of activities? Table XVI shows the comparison of 48 five-minute records taken by Observer A at the beginning and end of this period. These are distributed among eight children, the same number being used for each child at the last as at the first of the year. The scores for distance covered and number of activities were corrected for the influence of temperature by means of the regression coefficient.

TABLE XVI
COMPARISON OF FIRST AND LAST RECORDS TAKEN ON ROOF

Measure	Mean		σ		$M_{\text{First}} - M_{\text{Last}}$	Number of Five-Minute Records
	First Records	Last Records	First Records	Last Records	$\sigma_{M_{\text{First}} - M_{\text{Last}}}$	
Distance (yards)	17.30	22.02	10.86	14.22	1.83	48
Number of social contacts	4.17	5.67	2.21	2.34	3.26	48
Number of activities	7.54	5.17	3.09	3.25	3.65	48

Comparing the means for number of social contacts, 4.17 for the first and 5.67 for the last, we find an increase which is significant. The difference between the means divided by the standard error of the difference is 3.26. There is a significant decrease in number of activities. The mean number for the first of the year is 7.54; for the last 5.17; and the difference between the means divided by the standard error of the difference is 3.65. With distance covered the decrease from 17.30 to 10.86 yards is not so significant. Here the difference between the means divided by the standard error of the difference is 1.83.

¹ Huntington, Ellsworth, *Civilization and Climate*, Chapter V. Yale University Press, 1924.

LOCATION

It was mentioned once before that observations were made during the second part of the study in three different places—the roof, the upstairs playroom, and the downstairs playroom. Does this factor influence the distance covered, the number of social contacts and number of activities? Only the roof and downstairs playroom records are compared. Again A's observations are used. Conclusions are based upon 44 five-minute records distributed among six children. Any effect due to change over a period of time is discounted by taking half the roof records from the first and half from the last of the year. All the downstairs records were taken between these two periods, the only time when the children were downstairs. The average temperature for these two periods is practically the same. With the 44 roof records in question, the mean temperature is 51.96 degrees with a standard deviation of 7.64. The temperature of the downstairs playroom was kept not higher than 55 and not lower than 50 degrees. Here, then, so far as the temperature influence is concerned, we would expect decrease in activity downstairs.

TABLE XVII
EFFECT OF LOCATION UPON MEASURE

Measure	Mean		σ		$M_{\text{First}} - M_{\text{Last}}$	Number of Five-Minute Records
	Records on Roof	Records Downstairs	Records on Roof	Records Downstairs	$\sigma_{M_{\text{First}} - M_{\text{Last}}}$	
Distance (yards)	12.69	26.68	10.30	17.73	4.53	44
Number of social contacts	4.89	6.45	2.34	2.97	8.67	44
Number of activities . . .	6.59	7.25	2.73	2.82	3.53	44

The results presented in Table XVII show, however, an increase for each kind of activity considered. For distance covered the mean is 26.68 downstairs in comparison with 12.69 on the roof. The mean number of social contacts increases from 4.89 to 6.45 and that for number of activities from 6.59 to 7.25, and these differences are significant. When divided by the standard errors of the differences the figures range from 3.53 to 8.67. Location seems to have a marked effect.

CHAPTER V

INDIVIDUAL DIFFERENCES

The value of a measure of behavior depends not only upon whether it will give the same results if used a second time, but also upon its ability to differentiate among individuals in the activity measured and upon the relationship of the behavior studied to other activity. To obtain the same results when using a yardstick a second time, two aspects of the situation must be considered: the reliability of the measure itself and the constancy of the thing measured. Here, only the reliability has been tested. Any attempt at suggestion of individual differences, therefore, assumes constancy of behavior, which assumption may be wholly unjustified.

The ability of the measures described in the preceding chapters to differentiate among the ten children observed will be discussed first. Tables XVIII to XXIV, inclusive, show how significant they are as tested by subtracting one mean from another and dividing by the standard error of the difference. If this figure is 3 or more, then it is "practically certain" that the same child would be ahead if he were observed for 1,000 five-minute periods (providing behavior were constant). If the difference is less than 3, it is less certain. Each child is compared with every other child making a total of 45 comparisons for every measure. The children will be identified by Roman numbers I to X where I is the child with the highest and X the child with the lowest mental age as tested by the Kuhlmann revision of the Binet-Simon scale. For example, in Table XVIII, distance covered by Child I, the one with the highest mental age, is compared in the first row with that covered by every other child. He is more certainly different from Child VIII than from any other child in the group. The figure 2.88 is the difference between the means of I and VIII divided by the standard error of the difference.

To eliminate as many as possible of other influencing factors many records, unfortunately, had to be discarded. All records chosen are the result of observations made on the roof during October, November, and December. The average temperature for all these

observations was 37.5 degrees. A further selection of records was made so that this temperature would be the average for the records finally chosen for each child. It was necessary to make an exception in the case of Child VIII. All observations made of her were on warmer days. The average temperature of her records is 52 degrees. Child III had records with a wide enough range of temperature to compare her with both Child VIII and the group as a whole. Means of Child VIII were then adjusted according to the rate of difference displayed by Child III between the warmer and colder period. The records left after this elimination for the purpose of equalizing temperature, cover less than two months time, the first being on October 22 and the last on December 15. Location, change over a period of time, and temperature, therefore, are held constant. Furthermore, all these observations were made by observers A and C, the two who had the highest reliability.

The difference between the means divided by the standard error of the difference was determined for each combination of the ten children, 45 altogether. The median of the difference divided by the standard error of the difference is the criterion used for suggesting the order in which the measures are capable of differentiating, the highest median indicating the measure of most value. According to this measure, distance covered comes first with a median of 2.15; number of social activities next with a median of 1.69; number of social contacts third with a median of 1.65; number of material activities fourth with a median of 1.26; number of activities fifth with a median of 1.0; number of self activities sixth with a median of .9 and number of social-material activities last with a median of .41.

Table XXV is an attempt to show relationship among these and other measures of behavior. The ten children are ranked from high to low, high being the first and low the last row of the table. The child with the highest mental age is in the first row, the one with the lowest in the last. Mental age was determined by the Kuhlmann revision of the Stanford-Binet Test. The child with the highest I.Q. is in the first row; also the one who covers the most distance, the one who has the largest number of social contacts, number of activities, number of social, number of social-material, number of material, and number of self activities.

"Variability" is the average rank of the ten children in these last seven measures according to variability as expressed by the standard deviation. They were ranked from most to least variable in each measure and then the ranks averaged. The first row under "Average

TABLE XVIII
SIGNIFICANCE OF INDIVIDUAL DIFFERENCES
IN DISTANCES COVERED

Children Ranked Ac- cording to Mental Age (Highest is I)	Difference between Means/Standard Error of Difference									Mean	σ	Number of Five- Minute Observa- tions
	II	III	IV	V	VI	VII	VIII	IX	X			
I	.61	1.12	2.62	.56	2.20	2.60	2.88	1.47	.23	16.29	7.98	44
II		.75	3.10	.15	2.77	2.76	2.63	2.10	.37	15.38	6.09	46
III			3.15	.47	2.79	1.19	1.37	2.22	.95	13.87	9.59	28
IV				2.75	.58	4.48	4.42	1.44	2.78	23.40	12.41	26
V					2.36	1.77	1.89	1.73	.39	15.08	9.64	29
VI						4.29	4.20	.89	2.38	21.56	13.00	39
VII							.36	4.00	1.70	11.30	8.26	49
VIII								3.85	2.74	10.59	7.06	20
IX									2.81	19.22	10.44	43
X										15.91	6.71	35

TABLE XIX
SIGNIFICANCE OF INDIVIDUAL DIFFERENCES
IN NUMBER OF SOCIAL ACTIVITIES

Children Ranked Ac- cording to Mental Age (Highest is I)	Difference between Means/Standard Error of Difference									Mean	σ	Number of Five- Minute Observa- tions
	II	III	IV	V	VI	VII	VIII	IX	X			
I	2.51	3.79	.64	2.90	.56	0	1.40	2.37	.94	2.98	1.73	44
II		1.35	3.71	5.60	2.94	2.37	.20	0	1.53	2.15	1.43	46
III			5.21	6.80	4.11	3.57	1.06	1.40	2.84	1.73	1.47	49
IV				2.63	.06	.60	1.92	3.47	1.72	3.19	1.37	42
V					2.20	2.83	3.51	5.44	3.98	4.11	2.31	63
VI						.56	1.78	2.86	1.46	3.21	2.01	47
VII							1.38	2.31	.92	2.98	1.99	49
VIII								.20	.76	2.25	2.00	20
IX									1.48	2.15	1.61	53
X										2.64	1.58	39

TABLE XX
SIGNIFICANCE OF INDIVIDUAL DIFFERENCES
IN NUMBER OF SOCIAL CONTACTS

Children Ranked Ac- cording to Mental Age (Highest is I)	Difference between Means/Standard Error of Difference									Mean	σ	Number of Five- Minute Observa- tions
	II	III	IV	V	VI	VII	VIII	IX	X			
I	2.10	.98	2.59	2.16	.20	1.71	3.11	1.10	.73	4.34	1.78	44
II		.47	3.87	3.89	1.84	3.35	.75	2.72	2.29	3.52	1.93	46
III			2.92	2.49	1.02	2.17	1.00	1.70	1.39	3.79	2.58	28
IV				.92	2.14	1.12	4.53	1.51	1.73	5.92	2.78	26
V					1.58	.28	4.90	.78	1.05	5.31	1.97	29
VI						1.26	2.53	.76	.45	4.44	2.60	39
VII							4.15	.48	.28	5.16	2.77	49
VIII								3.47	2.98	3.25	1.03	20
IX									.76	4.88	2.72	43
X										4.71	2.55	28

TABLE XXI
SIGNIFICANCE OF INDIVIDUAL DIFFERENCES
IN NUMBER OF MATERIAL ACTIVITIES

Children Ranked Ac- cording to Mental Age (Highest is I)	Difference between Means/Standard Error of Difference									Mean	σ	Number of Five- Minute Observa- tions
	II	III	IV	V	VI	VII	VIII	IX	X			
I	2.00	.06	.97	2.42	2.16	.11	.48	.56	.56	2.39	1.78	44
II		2.22	3.11	4.51	4.45	2.28	2.00	1.34	1.34	3.17	1.93	46
III			1.00	2.60	2.39	.06	.46	.68	.68	2.37	1.59	49
IV				1.53	1.25	.94	.21	1.54	1.54	2.05	1.49	42
V					.42	2.53	1.19	2.86	2.86	1.59	1.56	63
VI						2.32	.98	2.63	2.63	1.70	1.26	47
VII							.42	.73	.73	2.35	1.58	49
VIII								.90	.90	2.15	1.91	20
IX									0	2.62	2.20	53
X										2.62	1.83	39

TABLE XXII
SIGNIFICANCE OF INDIVIDUAL DIFFERENCES
IN NUMBER OF ACTIVITIES

Children Ranked Ac- cording to Mental Age (Highest is I)	Difference between Means/Standard Error of Difference									Mean	σ	Number of Five Minute Observa- tions
	II	III	IV	V	VI	VII	VIII	IX	X			
I	.05	2.72	1.02	1.33	1.15	.35	.93	.57	.12	7.84	2.62	44
II		2.55	.89	.19	1.10	.27	.94	.58	.16	7.87	3.21	46
III			3.74	3.75	1.77	3.07	1.30	1.97	2.60	6.29	2.14	28
IV				.42	2.20	.67	1.76	1.50	1.12	8.42	2.11	26
V					2.39	1.02	2.00	1.76	1.42	8.69	2.72	29
VI						1.53	.06	.46	1.00	7.23	2.33	39
VII							1.23	.90	.47	8.04	2.76	49
VIII								.41	.53	7.19	2.53	20
IX									.45	7.49	2.99	43
X										7.77	2.47	28

TABLE XXIII
SIGNIFICANCE OF INDIVIDUAL DIFFERENCES
IN NUMBER OF SELF ACTIVITIES

Children Ranked Ac- cording to Mental Age (Highest is I)	Difference between Means/Standard Error of Difference									Mean	σ	Number of Five Minute Obser- vations
	II	III	IV	V	VI	VII	VIII	IX	X			
I	1.70	1.70	1.80	0	0	1.25	1.10	.80	0	.18	0	44
II		0	.07	2.10	1.40	.57	.23	.64	2.00	.35	.70	46
III			.07	2.10	1.40	.57	.23	.64	2.00	.35	.66	49
IV				2.20	1.50	.50	.18	.71	2.10	.36	.52	42
V					0	2.90	1.30	1.20	0	.14	0	63
VI						2.20	.95	.50	0	.21	.41	47
VII							.14	1.21	2.80	.43	.66	49
VIII								.63	2.50	.40	.92	20
IX									1.10	.26	.76	53
X										.15	0	39

TABLE XXIV
SIGNIFICANCE OF INDIVIDUAL DIFFERENCES IN
NUMBER OF SOCIAL-MATERIAL ACTIVITIES

Children Ranked Ac- cording to Mental Age (Highest is I)	Difference between Means/Standard Error of Difference									Mean	σ	Number of Five- Minute Observa- tions
	II	III	IV	V	VI	VII	VIII	IX	X			
I	.27	1.33	.12	2.41	.54	.12	.54	.15	.35	2.30	1.10	44
II		1.50	.14	2.40	.77	.36	.33	.11	.57	2.37	1.32	46
III			1.36	.53	.79	1.15	1.41	1.39	.88	1.98	1.28	49
IV				2.20	.62	.21	.44	.04	.43	2.33	1.23	42
V					1.65	1.90	1.85	.23	.35	1.89	.49	63
VI						.38	.89	.65	.15	2.17	1.19	47
VII							.59	.25	.21	2.27	1.33	49
VIII								.41	.74	2.50	1.47	20
IX									.46	2.34	1.40	53
X										2.21	1.24	39

Number of Remarks," stands for the highest average and with "Coefficient of Egocentricity" and "Per Cent of Negative Remarks" for the largest number of these. This material is from an unpublished study by Mary Fisher. "Coefficient of Egocentricity" is obtained by dividing all the remarks where self is the subject of the sentence by remarks where other people or things are the subject.

As for "Above Average in Body Measures" the column goes from most above down to least above.

"Linearity" is the average rank in three indices of linearity, the cephalic index, height over weight, and leg length minus trunk length. These measures were obtained from Dr. Rowland G. Freeman, physician of the Institute. The first row is the most and the last the least linear child, or going from linear to lateral. Stockard says:

The linear type is the faster growing, high metabolism, thin, but not necessarily tall group, while the lateral type is slower in maturing and is stocky and round in form.¹

"Number of Days Present" refers to the days upon which observations were made and the child with the best record is first in the column. The hemoglobin determinations were made by Virginia E. Platt, the nurse of the Institute, by the method of Cohen and Smith.²

¹ Stockard, Charles R., *Hormones and Structural Development*, p. 51. Waverly Press, Baltimore, Md. 1927.

² Cohen, Barnett and Smith, Arthur H., "The Colorimetric Determination of Hemoglobin," p. 489, *Journal of Biological Chemistry*, Vol. 39, 1919.

The child with the highest determination is in the first row. The dietitian, Elda Robb, selected the two children ranking first and second and the two at the bottom of the group from the point of view of good nutrition. The diet was evaluated from the standpoint of calories, protein, calcium, phosphorus, iron, and vitamins A, B, C, and D. This involves all the errors which might be found in mothers' records and for this reason only the best and the poorest were chosen instead of ranking them from one to ten. The best is in the first row. Jane Lingg, the posture expert, chose the two children whom she judged from observation to have the best posture and the two whom she judged to have the poorest. Good posture is indicated at the upper part of the column.

TABLE XXV
COMPARISON OF CHILDREN'S RANKS *

Rank	Mental Age	I.Q.	Distance Covered	Number of Social Contacts	Number of Activities	Number of Social Activities	Number of Social-Material Activities	Number of Material Activities	Number of Self Activities	Variability†	Average Number of Remarks	Coefficient of Egocentricity	Per Cent of Negative Remarks	Above Average in Body Measures	Linearity	Number of Days Present	Hemoglobin	Nutrition	Posture
First ..	1†	2	4	4	5	5	9	2	2	9	1	8	4	7	4	5	1	7	8
Second	2	1	6	5	4	6	3	3	8	7	5	2	3	1	5	6	8	6	3
Third ..	3	4	9	7	7	4	6	9	3	8	4	5	1	2	8	8	7		
Fourth	4	3	1	9	2	1	4	10	7	2	9	1	5	4	6	4			
Fifth ..	5	6	10	10	1	7	1	8	4	6	2	6	2	3	1	9			
Sixth ..	6	7	2	6	10	8	10	1	9	{5} §	7	4	8	5	7	7			
Seventh	7	5	5	1	9	10	7	7	6	{3}	6	7	7	10	{9} §	1			
Eighth	8	{8} §	3	3	6	9	2	4	1	4	8	3	6	6	{3}	3			
Ninth ..	9	{9}	7	2	8	2	5	6	5	10	10	9	9	8	2	{10} §	6	4	{2} §
Tenth ..	10	10	8	8	3	3	8	5	10	1	3	10	10	9	10	{2}	9	5	{9}

* First row highest rank

† Average Variability in {
Distance Covered
Number of Social Contacts
Number of Activities
Number of Social Activities
Number of Social-Material Activities
Number of Material Activities
Number of Self Activities

‡ Arabic numerals in this table indicate the children.

§ Braces indicate a tie for rank in this measure.

Since the ranks cannot be considered very reliable, none are compared except the extremes. Various information about each

child is brought together, and his outstanding ranks are mentioned first. The play materials most popular with the child are listed in order of the amount of time they were used. As stated before, the time factor is very uncertain, but since material was most often made the unit of observation where there was a combination of activities, the results are probably indicative of the equipment most frequently used, though the exact order might change somewhat. The time on materials is estimated from all the records made during the second study, 1,000 five-minute observations and not the group selected for comparison of ranks. The jungle gym as a result, does not appear as often as it should because of the fact that there was none in the downstairs playrooms.

The child's response to the psychological test situation is quoted verbatim from the psychologist's report. Impressions about the parents, the child's behavior at home and in the nursery school have been collected by various members of the Institute staff. They are quoted freely.

CHILD I

OUTSTANDING RANKS

First Rank

M.A.

Average number of remarks

Hemoglobin

Second Rank

I.Q.

Above average in body measures

Ninth Rank

Nothing

Tenth Rank

Variability in 7 measures studied

PLAY MATERIALS LISTED IN ORDER OF MOST FREQUENT USE

Doll Carriage	Tricycle
Blocks	Jungle Gym
Sandpile	Kiddie Kar
Swing	Drum
Slide	Book

RESPONSE TO PSYCHOLOGICAL TEST SITUATION

M.A.—52.1 months

C.A.—33 months

I.Q.—158

52 *Studying the Social-Material Activities of Young Children*

"'I' adjusted beautifully to the test situation. She was thoroughly delighted with the games and chattered constantly throughout the test. Her sustained effort was very good and her satisfaction in successful completion of a test was very keen. A slight tendency to rationalize or completely change a subject was noticed when she was faced with a recognizably difficult problem. Both on the performance scale and on the Kuhlmann her responses were consistent and quite typical of the very bright child."

HOME NOTES

"The father of 'I' is an instructor. The mother is an easy gracious hostess. She thinks 'I' is a leader among children. Parental attitude felt to be wholesome."

NURSERY SCHOOL NOTES

"Rather inclined to be selfish concerning the possession of certain toys. Playing much better and is very generous with her toys. She and 'IV' are very good friends. Has great flights of the imagination. When someone spoke about living up high, she said: 'I have a house *way* up in the sky and birds fly into it all the time.'"

CHILD II

OUTSTANDING RANKS

First Rank

I.Q.

Number of material activities

Number of self activities

Second Rank

M.A.

Coefficient of egocentricity

Ninth Rank

Number of social contacts

Number of social activities

Linearity

Posture ties with 'IX'

Tenth Rank

Tied for last place in number of days present

PLAY MATERIALS LISTED IN ORDER OF MOST FREQUENT USE

Slide	Wagon
Sandpile	Jungle Gym
Book	Wheelbarrow
Swing	Box
Blocks	Suitcase

RESPONSE TO PSYCHOLOGICAL TEST SITUATION

M.A.—48.9 months

C.A.—30 months

I.Q.—163

"'II' adjusted spontaneously to the test situation. He seemed interested in all test materials except the buttons in the Merrill-Palmer which he thrust aside before really trying. He seemed greatly interested in numbers, observing the numbers on the door and reading them. He also asked about letters at the bottom of one of the pictures that were too small for the examiner to read. Reaction time was very quick throughout. His hands were poised above materials waiting to begin immediately directions were completed. All verbal responses were promptly given. He is the type of child who seems to carry on a monologue frequently. Much of his planning is verbal. For example when placing the blocks in the Sequin Board he would say 'Over there this belongs. This belongs here. Now I'm going to put this in first. Where's this go? I found it.'"

HOME NOTES

"Both the father and the mother are instructors. Neither of the parents interested in handwork. Often argue as to the relative merits of Watson, Gesell, and others on their theories of child training. Say that 'II' is extremely affectionate. He puts his arms around the neck of the person reading to him, if he likes the story. The father insists upon his remaining gentle. Is afraid of his becoming aggressive."

NURSERY SCHOOL NOTES

"In nursery school he is happy and has adapted well. His chief interest is setting the tables for dinner. On the roof he plays alone a great deal. He gives up easily. He talks to himself and makes strange noises. Needs encouragement in doing things for himself such as washing his face and hands. He expects to be waited on. The maid does too much for him. Is often inattentive and tends to daydream. A seeming lack of comprehension when asked to do something. Poor appetite. Dawdling over food."

CHILD III

OUTSTANDING RANKS

First Rank

Nothing

Second Rank

Number of material activities

Number of social-material activities

Per cent of negative remarks

Posture

Ninth Rank

Nothing

Tenth Rank

Number of activities

Number of social activities

Average number of remarks

54 *Studying the Social-Material Activities of Young Children*

PLAY MATERIALS LISTED IN ORDER OF MOST FREQUENT USE

Sandpile	Slide
Swing	Snow shovel
Doll Carriage	Closet Door
Closet	Leaves
Kiddie Kar	Blocks

RESPONSE TO PSYCHOLOGICAL TEST SITUATION

M.A.—45.9 months

C.A.—37 months

I.Q.—148

"Responses on Kuhlmann consistently superior and the Word Opposites, 7th year, was but a marginal failure. She did pass repetition of 5 numerals at this level. This was a decided contrast, however, to her standing in the Merrill-Palmer, on which test M.A. was but two months above C.A. Her motor responses were consistently average."

HOME NOTES

"Father and mother both teachers in the public school. Parental relations harmonious. The father does not approve of spanking. The mother threatens with spanking but says that is all that is necessary. 'III' has temper tantrums at home. They are of very short duration. Occasionally when she is thwarted she goes out in the hall and bangs her head against the floor, but the parents pay no attention to her. The mother says it's probably her own temper cropping out in the child. 'III' seems at home, however, to be the same well-poised, happy child that she is in the nursery school. During a home visit she played with her toys very happily but flitted from one thing to another very frequently. Tried to climb on the kiddie kar and when it moved and she fell, she picked herself up with a laugh and tried climbing on a tinker toy. Once she picked up a tiny piece of radio equipment and put it in her mouth. When her mother said 'Have you something in your mouth,' she stuck out her lips and did not answer. Her mother spoke twice and then got up and quietly removed the piece. There was no fuss then or at other times when it was necessary to discipline. Once her mother said to her but without emotion 'Mommy doesn't like little girls that don't mind.' Even then 'III' never lost her happy, carefree expression."

NURSERY SCHOOL NOTES

None. Home notes make reference to good adjustment.

CHILD IV

OUTSTANDING RANKS

First Rank

Distance covered

Number of social contacts

Per cent of negative remarks

Linearity

Second Rank

Number of activities

Ninth Rank

Nutrition

Tenth Rank

Nothing

PLAY MATERIALS LISTED IN ORDER OF MOST FREQUENT USE

Sandpile

Doll Carriage

Slide

Tricycle

Kiddie Kar

Blocks

Platform

Closet Shelves

Swing

Steps

RESPONSE TO PSYCHOLOGICAL TEST SITUATION

M.A.—45 months

C.A.—30 months

I.Q.—150

"'IV' adjusted spontaneously to the test situation and seemed to be interested and happy throughout both test periods. She looked to the examiner for encouragement and assurance quite frequently at first, but this tendency became less marked as the tests progressed. Conversation was relevant. There was very little extraneous activity. Test results indicate a rather even development with no marked ups and downs."

HOME NOTES

"Father a musician; mother, homemaker. Mother has feelings of inadequacy. She and her husband want each other and a romantic relationship and feel that their two children encroach upon this desire. She is in a constant state of conflict over this. Father has never had experience with children and cannot understand why they need to make a noise. Parent concerned about 'IV's' manners and are anxious that she be a ladylike little girl. Mother wants to keep her 'precious.' Is very much afraid that 'IV' will not have a vivid imagination, and has been telling her fairy tales to stimulate it. Does not seem to recognize 'IV's' imaginative play as any indication of imagination. Much trouble about sleep at home. Often when she did not want to go to bed, she cried until people in other apartments called to her to keep quiet. Has not played with other children because her mother has not known what to do when children take her toys away. Most of her play at home supervised by her mother. She has no playmates. At home she seldom hears singing. She never hears a radio. She enjoys nursery lullabys on the phonograph. She likes the violin. She will listen to Beethoven symphony."

NURSERY SCHOOL NOTES

"'IV' one of biggest problems. She neither eats well nor sleeps well and is not gaining. Eating, marked slowness and dawdling with continual urging. Is very tense. When she goes to bed stiffens herself—often cries. She seems

56 *Studying the Social-Material Activities of Young Children*

to be nervous, highly excitable, and many times distraught. She fatigues easily and needs a mid-morning rest. At nursery school hilariously happy, yells and screams. Gets excited over things other children do. Seems to feel responsible for any of them who are hurt or in trouble. She is a very cautious child. When climbing on the jungle gym, she holds on very tightly. Much of her play is imaginative. She goes on picnics, rides on the train, has parties. 'IV' has always been unusually observant, and able to give her attention to two things at the same time such as looking at a book and commenting on noise outside or as when playing with a toy and apparently paying no attention to the music going on when she will sing a line at the correct place. She is very much interested in music. Always comes to victrola or piano. Sings as she plays. Often sings 'Rock-by-baby.'"

CHILD V

OUTSTANDING RANKS

First Rank

- Number of activities
- Number of social activities
- Number of days present

Second Rank

- Number of social contacts
- Average number of remarks
- Linearity

Ninth Rank

- Number of social-material activities
- Number of self activities

Tenth Rank

- Number of material activities
- Tied for last place in nutrition

PLAY MATERIALS LISTED IN ORDER OF MOST FREQUENT USE

Doll Carriage	Steps
Swing	Walking Boards
Sandpile	Closet Door
Truck	Jungle Gym
Blocks	Kiddie Kar
Doll Blanket	

RESPONSE TO PSYCHOLOGICAL TEST SITUATION

M.A.—44.9 months

C.A.—34 months

I.Q.—132

First Test

"'V' was definitely a problem in the test situation. Her initial reaction was distinctly negativistic. A certain amount of this was readily controlled, for it seemed to be nothing more or less than a gesture of defiance. 'No'

and 'can't' seem to be pretty much just a habitual response. The real problem arose when 'V' was faced with a problem not immediately and successfully solvable. Her attitude in putting the nest of cubes together was significant: 'I can't' . . . 'I can't' . . . 'I can't' . . . in increasing crescendo, accompanied her effort. She became very excited, futilely trying to pound them into place, and literally almost shook all over. However, despite her obvious dislike and distress, she persisted in the task almost four minutes, which is good for her age level. The same reactions were manifested in the Kuhlmann test, although these materials suffered more. Failing the first group of memory pictures, she was determined to tear them up or crumple them. She made definite bids for praise and had a marked feeling of triumph in success. An observer of the examination described her motions as explosive."

Second Test

"'V' readily coöperated and seemed interested in the test materials. Highest scores were made on tests involving comprehension and use of language. She seemed to have a very vague idea of spatial relationships and profited very little by experience on these tests. Her highest score on the Merrill-Palmer was the Action Agent test which involves language."

HOME NOTES

"Father a physician. Mother a graduate nurse. 'V' is negativistic toward parents—When told to say something will say 'I can't say ——' quoting the correct word. Father very indulgent. There is a good deal of kissing and embracing and saying 'I love you'—when asked whether she cares. Mother very fussy about her. Hangs around the school. Language ability marked. Her mother kept a record of her language, usually complete sentences—many long words. Health good. Eats without urging except for milk—fusses, wants it in different glasses."

NURSERY SCHOOL NOTES

"At first she waited to be told what to do. Seems to wait always in playing and asks 'What shall I do? Shall I do?' Turns to teacher very frequently for attention."

CHILD VI

OUTSTANDING RANKS

First Rank

Nothing

Second Rank

Distance covered

Number of social activities

Days present

Nutrition

58 *Studying the Social-Material Activities of Young Children*

Ninth Rank

Number of material activities

Hemoglobin\

Tenth Rank

Nothing

PLAY MATERIALS LISTED IN ORDER OF MOST FREQUENT USE

Tricycle	Slide
Sandpile	Truck
Blocks	Book
Kiddie Kar	Wagon
Chair	Ball

RESPONSE TO PSYCHOLOGICAL TEST SITUATION

M.A.—44.3 months

C.A.—31 months

I.Q.—143

“‘VI’ adjusted to the test situation very nicely. His responses on the Kuhlmann test were consistently superior; on the Merrill-Palmer a great deal of scatter was noted with a very superior response to the Action Agent test. He talked constantly and seemed somewhat dependent on the examiner for praise and encouragement. A slight tendency to rationalize is also noted when he was faced with a difficult problem. For instance, he would abandon the Mare and Foal which he was unable to complete, with the remark ‘I can’t do that, my hands are dirty.’ However, his sustained effort was very good and he would abandon a project only after having persisted well over the maximum time limit.”

HOME NOTES

“The father is an instructor. The mother was formerly an instructor. They are a happy, well adjusted family. ‘VI’ has a regular schedule for meals and sleep and plays out of doors daily. Enjoys physical activity. Gymnasium apparatus has been provided for him. Likes music, especially the victrola. Occasionally will sing.”

NURSERY SCHOOL NOTES

“At beginning of the year went about taking children’s playthings and throwing them about, but since his interests began to widen he has paid less attention to what other children have and is more concerned with his own interests. Has become more social and is showing evidences of a willingness to help other children. Chief interests are in playing with blocks and sand. At the beginning of the year he enjoyed piling blocks into the large red wagon and pulling wagon about. Now his block play has taken a more definite form and he is interested in constructing trains. Carries on very interesting dramatic play which usually takes the form of going on a trip on the train or boat. Enjoys domestic activities such as helping teacher wash toy dishes, and does a very thorough job. Likes to climb up outside of the stairs and then crawl through the railing. Is very daring and likes to try new things. He is very

sure of himself and shows no feeling of insecurity. Is anxious for approval of adults and is pleased when they enter into his interests. Interested in listening to stories. Listens intently and often asks to hear one again. Has a good vocabulary and talks a great deal. Speaks clearly. Is imaginative. Carries imaginative objects as, baby chickens, bones for dog, money, etc. in his hands and presents them to adults. Becomes overstimulated very quickly when with the group and it has been necessary to provide extra rest periods during the morning. Has splendid attitude toward rest and sleep. He goes into the sleeproom, takes off his own slippers and gets into bed by himself. He can cover himself with the green blanket. Relaxes and keeps very quiet until he falls asleep. Has days when he eats everything quickly and with a relish. On other days he is extremely slow. He dislikes tomatoes and shudders when he eats them."

CHILD VII

OUTSTANDING RANKS

First Rank

Above average in body measures

Nutrition

Second Rank

Variability in 7 measures studied

Ninth Rank

Distance Covered

Tenth Rank

Nothing

PLAY MATERIALS LISTED IN ORDER OF MOST FREQUENT USE

Slide	Kiddie Kar
Blocks	Bench
Sandpile	Closet Doors
Closet	Building Boards
Doll Carriage	Jungle Gym

RESPONSE TO PSYCHOLOGICAL TEST SITUATION

M.A.—33.8 months

C.A.—25 months

I.Q.—135

First Test

"'VII' did not seem unhappy in the test situation but was never completely at ease. The rating may be tentative as a number of the tests were refused. 'VII' would not attempt to repeat numbers and sentences, refused to give her name and sometimes refused to imitate. The nursery school teacher was present when the Kuhlmann test was administered and seemed to think the child's behavior was quite characteristic and that she was probably doing as well as she could."

60 *Studying the Social-Material Activities of Young Children*

Second Test

"'V' talked spontaneously and did not seem to be shy but refused to attempt certain tests, both in the Kuhlmann and the Merrill-Palmer scales. This resistance was gradually overcome. Scores earned on both tests place 'VII' in the superior group. Her Kuhlmann score is considerably superior to her Merrill-Palmer score. Comprehension and use of language was very good."

HOME NOTES

"The father is an instructor; mother, a homemaker. The parents have a matter-of-fact attitude toward 'VII' in the home. The social life of the family seems to be fairly satisfying."

NURSERY SCHOOL NOTES

"In nursery school is determined to have her own way and is disagreeable if things do not go to suit her. Protests loudly and forcibly whenever a child attempts to touch whatever she is playing with, but does not hesitate to grab a desired plaything from another child. No sense of sharing. Inclined to be sulky. Prefers to play alone and will interest herself for long period. At times she is very sympathetic and when a child cries, she hurries to him, pats him and says 'You're all right.' General nutrition excellent with a tendency toward excessive deposition of fat. Is not interested in food. Is very independent in bathroom and resents any help offered her. Is very slow and deliberate in all procedure but can take responsibility. Is restless at nap time and takes a long time to relax. Goes to sleep more quickly if adult sits near her.

CHILD VIII

OUTSTANDING RANKS

First Rank

Coefficient of egocentricity

Posture

Second Rank

Number of self activities

Hemoglobin (Tied with VII)

Ninth Rank

Above average in body measures

Number of activities

I.Q. (Tied with IX)

Tenth Rank

Distance covered

Number of social contacts

Number of social-material activities

PLAY MATERIALS LISTED IN ORDER OF MOST FREQUENT USE

Sandpile

Jungle Gym

Wagon

Walking Boards

Doll Blanket

Purse

Slide

Stick

Doll Carriage

Telephone

RESPONSE TO PSYCHOLOGICAL TEST SITUATION

M.A.—33.5 months

C.A.—27 months

I.Q.—124

"'VIII' adjusted to the test situation excellently from the standpoint of coöperation and enthusiastic interest. However, the great amount of extraneous activity and constant conversation may possibly have penalized her from the standpoint of the test rating. With one exception her sustained effort was only fair. However, in this one instance—the four buttons—she voluntarily persisted for 6½ minutes, indicating that with adequate motivation her habits of concentration could probably be excellently established. In connection with her previous examination it is interesting to note that on her Kuhlmann test she dropped considerably. Again, as noted on the previous report, she failed to name the colors correctly in the test situation, recognizing three of them, but failing on red. However, during the examination she twice spontaneously commented on the examiner's red dress. Another outstanding characteristic noticed by the examiner was the keen satisfaction expressed when a test had been completed. However, she did not always indicate perfect insight into her own abilities as she frequently joyously finished a test incorrectly and even upon questioning wouldn't recognize that it was incorrect."

HOME NOTES

"Father and mother both belong to the professional group. Relationship between father and mother reported 'good,' no dissension in regard to discipline or anything else. The relationship between mother and child seems very good. During home visit 'VIII' was very independent and resourceful. She greeted visitor in happy friendly way saying 'take hat off.' Entertained herself throughout visit unless asked by mother to show visitor something. She has the freedom of the house but keeps her toys in a large box. At eight months had new maid—very strict. Began to suck fingers at that time. With maid most of the time as both parents work. Mother worried about her dreams. A little over a week ago 'VIII' dropped her bunny on the floor while at an entertainment, and she looked ready to weep. The mother picked it up and told her not to feel badly, but she remained on the verge of tears for she seemed to feel that the bunny had been hurt. That night she cried out in her sleep for she thought the bunny was on the floor. It seems to show that she is a sensitive child and very tender hearted. The mother gives the impression of being an over-conscientious mother and one who is too absorbed in studying and interpreting every thought and action of her child. This tendency is intensified by the fact that 'VIII' is the object of admiration in the settlement where they live, and she is held up as an example of the proper method of bringing up a child. The mother said she would be only too glad to have the child used as an experiment in the school and would welcome any suggestions in regard to her treatment. Has very long tiresome trip to get to nursery school."

62 *Studying the Social-Material Activities of Young Children*

NURSERY SCHOOL NOTES

"In nursery school 'VIII' has always been independent of mother. Did not cry even first day when mother left. She doesn't talk much. Stands around watching other children. Sucks her fingers. Most agreeable always, even when vaccination was very bad. Stocking put on her hand when she goes to bed, so she cannot suck her fingers. She holds up her hand willingly for it. To sleep in 10 minutes or less."

CHILD IX

OUTSTANDING RANKS

First Rank

Variability in 7 measures studied
Number of social-material activities

Second Rank

Nothing

Ninth Rank

M.A.
I.Q.
Coefficient of egocentricity
Per cent of negative remarks

Tenth Rank

Above average in body measures
Hemoglobin
Posture (Tied with II)

PLAY MATERIALS LISTED IN ORDER OF MOST FREQUENT USE

Sandpile	Book
Truck	Victrola
Blocks	Slide
Ball	Dishes
Wagon	Kiddie Kar

RESPONSE TO PSYCHOLOGICAL TEST SITUATION

M.A.—32.2 months

C.A.—26 months

I.Q.—124

"'IX' came willingly with examiner and was happy and contented in the test situation. He responded readily, but attention was easily distracted; he frequently left his chair to run to some object in room. If some plaything which he wanted was taken away or some problem proved too difficult he would grow very impatient and almost cry. A word from examiner would quiet him. Many of his responses were of the echolalia type. On the Kuhlmann test he rates superior intelligence passing all but the circle test in the two-year level and three tests in the three year level. On the Merrill-Palmer he rates average in intelligence."

HOME NOTES

"The father is an instructor. The mother also does work that would place her in the professional group. Greatest problem home conditions—left almost all the time in charge of maid. At home he chews clean cloth when goes to sleep—does not at nursery school."

NURSERY SCHOOL NOTES

"In nursery school adjusted well. Accepts new situations and new people easily. He is interested in mechanical things and experiments with sounds and words he hears. Plays nicely with the children and has few difficulties. He loves to tease and gets special pleasure trying out the student teacher. Cries and whines for things he wants. Very active child—always busy. Pays little attention to the other children. Uses all material and apparatus. Interested in hearing victrola; also in mechanism of victrola. Does not make singsong noises the way most children do. Has very tiny bones and is 3 pounds below average weight for height probably normal for him. Sleeps well. Eats well. Takes no responsibility for the toilet. Needs much help in washing, etc., but takes some responsibility.

CHILD X

OUTSTANDING RANKS

First Rank

Nothing

Second Rank

Nothing

Ninth Rank

Variability in 7 measures studied

Tenth Rank

M.A.

I.Q.

Number of days present (Ties with II)

Number of self activities

Coefficient of egocentricity

Per cent of negative remarks.

MATERIALS MOST FREQUENTLY USED

Slide

Doll Carriage

Snow Shovel

Steps

Closet

Truck

Blocks

Tricycle

Wagon

Sandpile

Swing

64 *Studying the Social-Material Activities of Young Children*

RESPONSE TO PSYCHOLOGICAL TEST SITUATION

M.A.—20.0 months

C.A.—21 months

I.Q.—95

“‘X’ did not adjust readily to the testing room, but after he had been allowed to wander in the hall, investigate the equipment and walk in and out of the room, he came in of his own accord and started to play with blocks. There were so many refusals on the Merrill-Palmer that his score was low, but he tested almost at age on the Kuhlmann. No tests were failed at the two-year level and the only refusal was the Imitation of Movements. No response during the test gave an indication of superior ability and it seems to the examiner that the average rating is a fair measure of his level of intelligence.”

HOME NOTES

“Father a musician; mother, a homemaker. Home relations very harmonious. ‘X’ adopted when one month old. Has twin brother.

NURSERY SCHOOL NOTES

“Happy, smiling, good-natured. Tumbles down but picks himself up and goes on playing. Interest span in one activity very short. When he does a stunt he looks at people in room to see if they are watching. Very affectionate—comes running for a hug, is content when he gets it and goes on with play. Misses his twin if he is away for 15 minutes or more. Play around one another, not together. Good appetite; good digestion. Goes to sleep quickly. Makes a slight attempt to feed himself. Bathroom behavior unsatisfactory—does not tell when he needs attention. Not able to wash himself or get his towel. Masturbatory activity.”

One way of gauging roughly the relationship between measures is to see whether the two children ranking first and second in a measure have a rank difference of but one in any other measure. The same comparison can be made for the two children ranking last and next to last. If the two at the top and the two at the bottom of any measure are both found to be but one rank apart in some other measure, that would seem to be even better proof of some degree of relationship between the two measures. Take social activity, for example. The two children ranking first and second (V and VI) are found to be only one rank apart in two measures—mental age and number of material activities. The two children last and next to last in social activity (II and III) are but one rank apart in three measures, mental age, number of social contacts and number of material activities. The two at the top and the two at the bottom of the social activity measure have two other measures in common where they have a rank difference of only one, mental age and number of material activities.

It is concluded, therefore, that there is some degree of relationship between social activity and two other measures, mental age and material activity.

All seven measures were studied similarly. According to the method of comparison just described in the case of social activity, four measures gave no indication of relationship. These are social-material activity, social contacts, number of activities, and self activity. Social activity, as shown above, appears to be related to mental age and material activity. Material activity is related to mental age and social activity, and distance covered to social activity. Since social activity and material activity seem to bear the closest relationship to other measures and since there was some difficulty in timing these when both were observed by one person, the suggestion is repeated that two people make observations simultaneously, one observer noting social activity and the other material activity, and that the results then be combined.

CHAPTER VI

SUMMARY AND CONCLUSIONS

An attempt has been made to evaluate a technique for recording observations of the spontaneous reactions of children two to three years of age to material objects and to people. This evaluation has been limited for the most part to a study of the reliability of the measures used. The possibilities of the measures for differentiation among individuals have been considered but briefly while the relationship to other forms of behavior has scarcely been touched. Nothing has been done with constancy of behavior from day to day except with respect to the influence of temperature, humidity, and location. Constancy of behavior was assumed, however, during the discussion of differentiation and relationship, but this assumption may be unjustified.

The technique required an observer to chart on a floor plan drawn to scale the movements of a child during a five-minute interval. Simultaneous records of two observers working independently were made to study reliability. Three methods were used for testing reliability. The agreement of observers was measured first by the Pearson correlation coefficient. The significance of the difference between means was found next and, third, where there were enough records on individual children, the rank order of the children according to the means of the two observers was compared by the rank system of correlation. The author's conclusions follow:

I. Reliability

A. Distance covered.

The agreement is high measured by the Pearson correlation coefficient. The range is from .89 to .98 for eight pairs of observers. The differences between the means divided by the standard errors of the differences range from no difference for one pair of observers to a significant difference (difference divided by standard error of the difference equals 3) for three pairs of observers. Ranking the children accord-

ing to the means of two observers, the correlations by the rank system are .96 and .99 for the two pairs tested this way.

B. Number of social contacts.

The agreement is not so high for recording social contacts as for distance covered. These correlations range from .47 to .80 for nine pairs of observers, eight different pairs and one pair retested. The differences between the means divided by the standard errors of the differences range from .45 and .67 for two pairs of observers to significant differences for three pairs. The two pairs tested for agreement by ranking children according to their mean scores have correlations of .73 and .47, whereas they were .47 and .61 when the scores for five-minute periods were compared.

C. Time of activities.

The agreement of observers in timing activities is apparently high, ranging from .93 to .98 for nine pairs of observers, eight different pairs and one pair retested. Two activities were sometimes considered as two by one observer, but as only one by another in timing. The times for the two, were added to obtain the correlation coefficients. It is difficult, therefore, to draw any conclusions concerning true reliability in timing. The differences between the means divided by the standard errors of the differences range from 0.00 difference for two pairs to 1.48 for one pair. Agreement by ranking children according to their mean scores obtained by two observers gave a correlation of .91 for both pairs tested in this way. The agreement of observers for observation periods of less than one, two, three, four, or five minutes was also tested by the Pearson correlation coefficient. The highest agreement is for activities of less than one minute, $.89 \pm .01$. There are not enough activities in the four- and five-minute groups to draw accurate conclusions.

D. Number of activities.

The agreement of observers as to number of activities is somewhat the same as for social contacts. The Pearson correlation coefficients range from .60 to .87 for the three pairs compared. The differences between the means divided

by their standard errors range from 1.77 to 2.90. The observers' agreement not tested by ranking children according to their mean scores. Number of activities was classified as social, material, and social-material. The agreement of observers for these three groups ranged from .43 to .71, the reliability being approximately the same for all when three pairs of observers compared. The difference between the means divided by the standard error of the difference is significant for number of social activities with one pair. Five of the differences divided by the standard errors of differences are below .90.

II. Possibility of the measures for differentiating among individuals

Activities were classified as social, material, social-material and self. Since observers were not very successful in timing activities according to this classification, a very rough measure of frequency of occurrence is all that could be used in a comparison of individuals. The difference between the means divided by the standard error of the difference was determined for all combinations of the ten children. The median of the difference was the criterion used for suggesting the order in which the measures are capable of differentiating the highest median indicating the measure of most value.

1. Distance covered
2. Number of social activities
3. Number of social contacts
4. Number of material activities
5. Number of activities
6. Number of self activities
7. Number of social-material activities

III. Relationship of each measure of activity to other measures of activity

Of these measures social activity and material activity bear the closest relationship to the others if rank differences of 1 in the other activities for the children at the top and bottom of these measures is the criterion. Distance covered comes next. The others bear no relationship.

IV. Other Influencing Factors

- A. Temperature seems to be inversely related to the activity studied. The relationship as expressed by the Pearson cor-

relation coefficient is $.53 \pm .03$ for number of activities and $-.42 \pm .03$ for distance covered. The other relationships are very slight. There is no relationship between temperature and distance covered unless the entire temperature range is used. The correlations range from .10 to .09 for different parts of the temperature scale. There is relationship between temperature and number of activities only for records made when the temperature is above 52 degrees in which case it is $-.67 \pm .05$.

- B. Humidity bears no relationship to the measures. The correlations range from $-.06$ to $-.03$.
- C. Significant change between the first and last of the year seems to occur in number of social contacts and number of activities, the differences between the means divided by their standard errors being 3.26 and 4.21. There is probably some change in distance covered, but it is not so significant, difference divided by the standard error of the difference here being 1.54.
- D. Location seems to affect significantly distance covered, number of social contacts, and number of activities. All the differences divided by the standard errors of the differences are over 3.

The chief criticism of the technique is that it attempts too much. Social and material activity should be studied simultaneously, but not by one person. One observer should record the child's response to people and another his response to material objects. Then the observations should be combined to obtain a picture of his activity as a whole. Such a study is now under way.

FAIRVILLE COLLEGE
LIBRARY

DATE DUE

OCT 24 1977

JUN 13 1979

15560

O'Rear-Robinson Library,
Pikeville College

